

## NEWS IN BRIEF

OECD study  
by Logica

THE economic and social implications of international transmission of computerised information in Europe are to be studied by Logica under a contract from the Organisation for Economic Co-operation and Development.

The OECD is staging a seminar on the subject in Vienna from September 20-23. The Logica study will provide information on the use that is already being made of international data networks in Europe.

## Amdahl profits

AMDAHL Corp reports that in 21 months of active marketing of its 470V/6 mainframe, aggregate pre-tax profit has matched the total start-up investments made in the first five years following the foundation of the company in 1970.

## Privacy views

THE combined views of the BCS, the CSA and the DPMA on privacy will be issued soon in a statement being prepared at a meeting of those organisations this week. While differing on the details of privacy legislation, the three hope that an industry view on privacy matters will help the Data Protection Committee in drawing up proposals for legislation.

## Warwick's one 168

THE IBM online bureau service based on a new centre in Warwick, (CW, November 26, 1976), is now expected to go live next spring with one 370/168, although the centre has the capability to hold six 168s. The network will have 80 high speed lines and will be monitored and controlled by a Medius network management system from International Aeradio.

Stansaab is 50 per cent owned by the Swedish government, and there is anger over the Com-

ONE  
THAT  
GOT  
AWAYICL aims to  
double  
its turnover

A DOUBLING of turnover to £724 million by 1982 with 80% of business coming from overseas, is the main aim of ICL's plan for the next five years. And this performance would be achieved with only a 14% increase in staff to 35,700, giving ICL a turnover per employee of £20,300 and putting it in line with US competitors.

The plan shows that of the hardware orders in 1982, almost two-thirds by value will be for products which have not yet been announced. It indicates that those products could include a laser beam printer running at 20,000 lines per minute, holographic memory, disc systems with capacities of 20 times those of today's systems, and processors handling arithmetic at 50 times the current top rate.

"Even to maintain our present level of orders we must sell users the ability to process about 10 times as much work as at present," says the company.

ICL expects there to be a continued demand for medium-sized systems, and next year it plans to introduce the S1 and S2 and step up production of the 2600s.

These medium-sized machines will help spread management control among individual enterprises, memory chips and other integrated circuits, which are the standard devices used in the Stansaab Censor computers.

If the licence is not granted, Stansaab can get similar components from Japanese manufacturers, but this would entail some redesign which would be costly in both time and money.

The USSR is anxious to get the system into service by 1980 because of the vast increase in air traffic which will be generated by the Moscow Olympics.

Stansaab is 50 per cent owned by the Swedish government, and there is anger over the Com-

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P to Q3  
disc mate

THE chess challenge game between British International master David Levy and the Russian program Kaisa was abandoned on Sunday due to a disc interface fault.

The match was due to take place in Toronto after the Second World Chess Championship and was sponsored by an international consortium with Computer Weekly, Amdahl Corp, I. P. Sharp, and Control Data, all providing resources to try to get the game underway.

Levy has a £1,250 bet with a number of academics that he will not be beaten by a computer chess program before August, 1978, and has already beaten the new computer chess champion, Chess 4.6.

Kaisa, running on an IBM 370/1138, had lost its world computer chess title (see Page 2) and it was thought that, against a human master, the more powerful Amdahl 470 V/6 might be needed. Amdahl therefore made available a V/6 at its Sunnyvale, California, site.

Last Friday, with Levy at Sharp's Toronto office, the first attempt was abandoned because of a fault in the transmission of the program.

On Sunday at 10 am, Levy, having won the toss, phoned through the first move from a hotel in Columbus, Ohio.

The move, P to Q3, was input by another international master, L. Day via a terminal at Sharp's Toronto HQ which had again

specification. "Once we have checked that the devices meet the required performance, we check price, delivery and additional functions offered," said a spokesman.

The Infotron devices included additional features outside the specification that we believe our customers will need. These include automatic retransmission on error, buffer storage for short line breaks, and data compression."

Case points out that it could offer these features by modifying its present product, and believes it should have been

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US firm gets  
big PO orderTwo new  
views

Two leading figures in the international world of computing, Professor Donald Michie and Tom Gibb, are to write regularly in Computer Weekly. They will write in alternate weeks and will deal with a wide range of topics covering all aspects of computer research, development and use.

The basic system consists of a 48K-byte processor, expandable to 80K-bytes, five Megabytes on disc, tape cassette, VDU and 55 lpm matrix printer, and costs £21,450 for the hardware. Standard software packages for manufacturing, distribution and financial applications are available.

Maximum configuration offers 20 Megabytes on disc, three VDUs and line printers running at up to 200 lpm. Up to six tasks can be run concurrently.

The disc drives, with capacities of 4.8 or 9.6 Megabytes on fixed discs are new, it is the 200 lpm band printer. There are also new matrix printers with average speeds of 70 and 125 lpm.

ICL has also slashed the price for add-on memory for the I-8250; an extra 16K-bytes now costs £1,230 instead of £2,250 and an upgrade path via the I-8250 to the I-8430 is also provided.

ICL is now prefixing the model numbers of its 8000 series machines with an I, an N or a V. "I" means that the system is primarily for interactive working, "N" implies that it works in "normal" or batch mode, and "V" means that it is a virtual system.

## New HP line soon

A new range of commercial systems is expected to be launched by Hewlett-Packard within the next few months.

## DEC mainframes

THE future of the DECsystem line of 36-bit mainframes lies with the newer DECsystem-20 rather than the DECsystem-10, said a DEC spokesman. US sources suggest that the current 2050 processor will be complemented by a 2080 with cache memory.

## Tote choice

FOLLOWING the cancellation of its contract with General Automation earlier this year (CW, March 31), and its decision still to go ahead with its £3 million plan for computer controlled betting systems (CW, July 28), the Tote has opted for Digital Equipment PDP-11/34

minicomputers.

## NCR Datapac link

CLOSELY following the announcement of its Distributed Network Architecture, oriented towards packet-switching technology, NCR is to supply an interface processor complete with Standard Network Access Protocol software which will enable Canadian businesses to use the Datapac packet-switched network for linking to remote computers.

## School system

ONE of the UK's leading schools, Manchester Grammar School, is installing a Systech series 3000 computer as a teaching aid for the 1,450 pupils

AS a protest against the imprisonment of Russian computer scientist Anatoly Shcharansky, the executive of the American Association of Computer Machinery has decided to stop co-operation with or co-sponsorship of any events where Russian computer scientists play a significant role.

Shcharansky has not been heard from since his arrest five months ago on charges of being a CIA agent.

Some senior members of the ACM council, however, are to challenge this decision at the next council meeting on October 10. The grounds that more can be done for Shcharansky in particular, and Soviet scientists in general, by maintaining contact with the Soviet scientific world.

The Shcharansky issue simmered beneath the surface throughout IFIP, erupting on the penultimate day when ACM president Herb Grosch announced the non-co-operation decision at a meeting called to protest against Shcharansky's imprisonment.

Mrs Shcharansky is now living in Toronto, and as her husband has been particularly involved in computer chess, IFIP became a focus of the international campaign to release him.

A number of computer chess experts in Toronto for the world

computer chess tournament, signed a letter of protest about Shcharansky's treatment.

The campaigners for Shcharansky claim that he is being persecuted as part of a general Soviet anti-Semitic campaign.

The Russians claim, however, that his contacts with other leading dissidents, such as academician Sakharov, and Western politicians like Senator "Scoop" Jackson, show that Shcharansky was involved in what they call anti-Soviet activities.

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## ACM ban in aid of Russian scientist

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This is the second "Buy British" row that has blown up recently and comes only a week after the Employment Services Agency came under attack from Labour MP Eric Moonman for preferring US Interdata minis to British alternatives from Digico (CW, August 11).

In this latest instance, the Post

Office has placed a £500,000 order with Infotron, a small US

company, based in Pennsauken, New Jersey, for multiplexers for the Dataplex service. Case was awarded a similar contract but is refusing to accept it because it claims that it could have filled the complete requirement and considers that, as a British company, it should have been awarded the whole £1 million deal. Case has already had two Dataplex contracts on a non-competitive basis.

The specification for the tender this time was the same as on the last two occasions," said managing director, Derek Laval, told Computer Weekly.

The Post Office agrees that the Case multiplexers met the

computer chess tournament, signed a letter of protest about Shcharansky's treatment.

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## Microdata bids for CMC Europe

AFTER less than two years under full European ownership the three companies that make up CMC Europe now look like returning to US ownership. Microdata, minicomputer manufacturer of Irvine, California, is bidding \$11 million for the group.

Microdata's president, Don Fuller, told Computer Weekly that he hopes the deal will be completed within two months.

The main CMC business is the manufacturing and marketing of key-to-disc systems, but the UK company has also been selling the Microdata Reality line

inquiry system for two years.

In France Reality is built under licence and marketed by InterTechnique, and Fuller says this agreement will not be changed.

The deal will not affect the agreement between Sycom and the CMC companies under which the latter sell the Sycom 400 terminal cluster in Europe. (CW, February 17). Earlier this year Sycom was interested in acquiring a majority share in CMC but negotiations were not concluded. (CW, May 19).

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## COMPUTER WEEKLY'S INSIDE NEWS

Toronto tales

Last week over 3,600 people from 50 countries gathered in Toronto for IFIP '77, an international congress in which nearly 100 sessions were held in five days.

Malcolm Peatt and Stephen Bell were there to provide an on-the-spot report on the flesh and blood behind the facts. And Chad was there to provide a few downtime notes.

For his full explanation of some of the problems of protecting privacy on computer databases, John Welford won third prize in the Computer Weekly/Infoshare data security competition. His prize-winning entry is published this week.

Computers seem far more to accountants than merely acting as supercharged book-keeping machi-

nes. They can use computers in a wide range of important functions, including financial modelling, corporate planning, costing and a variety of specialised accounting applications. This week's supplement deals with some of these applications.

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## COMPUTER WEEKLY

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## DOWN TIME

by Chas.

## Terror of the Toronto bus

THE Canadian air traffic controllers' strike may have cut the attendance at IFIP down from the originally projected 4,000 or 5,000 to about 3,800. But those who did attend can now bore their friends with their own particular tale of the Toronto bussing terror.

Computer Weekly's team, for example, spent eight hours getting to Detroit, during which British Airways showed the Silver Strike and one reel of "Fun and Games With Dick and Jane" as the steward called the Jane Fonda-George Segal film.

A 4½-hour ride was then promised to get to Toronto. It turned out to be a seven-hour trip, including an hour-and-a-half stop at the border to have passports stamped, plus a three-times-round Toronto airport forced while the authorities decided whether or not luggage should be checked by Customs.

Our American correspondent, Hesh Wiener, had a shorter bus ride from Niagara Falls. But one of the three buses taking his plane-load of



The optimism of the band of the Royal Regiment of Canada which performed at the opening ceremonies ranged from "Everything is Coming Up Roses to I'm Looking Over a Four-leaf Clover."

Paul Godfrey, chairman of the council of the municipality of Metropolitan Toronto, could have done with a touch of the clovers. In welcoming the delegates he said, "I am sure you will

## Passing over the 13th

THE well-known APL specialist, I. P. Sharp, lives on the 14th floor of the York Centre in Toronto. As in many North American buildings, the 14th floor is the one above the 12th.

This particular example of the superstition is obviously the fault of the building's designers rather than Sharp, but a spokesman admitted that "The company does suffer badly from triskadekaphobia".

It seems that some Sharp people also suffer badly from dictionary-swallowing but, after all, APL and Greek do have a lot in common.

One of the manifestations of Sharp's fear of 13 is the numbering of its APL update notices to users, which also avoid the dread figure. This enabled one enterprising em-

ployee to insert a "spoo" notice, with the reference number 13, informing users of a function called "Quad-CL".

This would advise a user that the output obtained from a program, while not that expected, was reasonably close.

• One of the characteristics of any convention like IFIP is the way so-called experts can fundamentally disagree on crucial issues. Compare, for example, the following statements:

"I am sickened and appalled by the standard of programming to be found in hobbyist magazines."

Professor Edger Djikstra, structured programming specialist.

"Hobbyist software tends to be better written than commercial programs." — Packet-switching expert Paul Baron.

In the world of the expert, perhaps the one-eyed naïve never could be king!

DAVE HARAN

Department of Special Research, University Hospital of South Manchester.

## 'Use of computers in libraries should be stamped out'

IN the view of one US librarian, promises made about the use of computers in libraries were fraudulent, large sums of money were spent for small return, and such machines should be stamped out.

This was one of many lively quotations given by Professor Gerard Salton, of Cornell University, when he spoke at a joint meeting of the BCS Information Retrieval Group and Cambridge University Computing Department, at which Professor Gerard Salton, of Cornell University, introduced some provocative views on the use of computers.

It was determined instantaneously.

Professor Salton also gave a rapid glimpse of a future in which the problems of storing and transporting knowledge in heavy books could be eliminated. Texts could be created in electronic form; searching and retrieval could be by terminal access to text, graphs and tables through the telephone network; requested items could be made available either as microfiche or computer generated from stored text.

In discussing present and recent research

effort, Professor Salton suggested that we were now in a position to make substantial improvements in information retrieval, although no commercial manufacturer had yet mounted a system using these modern ideas. A desirable system would include these components: an automatic indexing system with an open-ended vocabulary which could adapt to a changing environment; an automatic method for producing a tentative content analysis; a method of clustering documents by means of some similarity measure so that like objects could be stored together and represented by a

sample member to reduce the number of documents scanned in a first computer-interactive searching with relevant feedback, so that the experience of searching could be used to modify the indexing and classification; a dynamic environment in which the feedback was allowed gradually to promote or retire documents so the reclassification determined by cumulated searching experience could take place.

The research by Professor Salton at Cornell and by Dr K. Sparck-Jones and others at Cambridge, has placed us in a position where these methods are available for implementation to create the new generation of retrieval systems. However,

in reply to a question, Professor Salton was rather gloomy on the prospects of these ideas being easily accepted in library schools, since he felt that the curriculum was totally wrong.

He believed that few professors in library

schools knew enough to teach these new methods and even fewer students would understand them owing to their lack of mathematical vocabulary and understanding.

It is intended to follow this successful meeting with a forum presenting alternative store technologies for very large databases. This meeting will take place at City University on Wednesday, September 26, 2 p.m. Details can be obtained from P. W. Williams, Computation Dept., UMIST P.O. Box 88, Sackville Street, Manchester.

## LETTERS

## Public service notion

LET me say how alarmed and disappointed I am by the largely self-interested approach of the articles concerning posts and telecommunications that have appeared in Computer Weekly.

To judge by these reports the advent of computers is the most important event to hit the Post Office. But to whom is it so important?

Obviously to Iain Barron, Chris Evans, ICL and IBM — it is their livelihood. But let us not confuse the interests of the computer industry and its gurus with the interests of the average person in the UK.

While the telecommunications side of the Post Office has been making ever-increasing profits by placing massive investment into high technology, the postal service has been rapidly deteriorating. It may well be that "computers are going to affect all our lives," but not necessarily for our own good.

The telephone is by comparison an ancient invention yet still we have not reached the era of a "phone in every home". I do not think we need to fear a "terminal in every home" in the lifetime of this planet.

The most important problem as I see it is one that receives little space in your columns. How much power has the man in the street to safeguard the meagre postal service that remains to him (and which he understands) against the advance of big business and computer technology which press for ever more investment in high speed telecommunications?

Surely, the user is the one who is going to derive the greatest satisfaction from obtaining his output on time, accurately computed. This calls for a high degree of enthusiasm in the relevant departments.

The stark reality is that these departments have been sadly neglected, badly motivated and totally ill-prepared for their role in customer liaison.

This simply does not just happen. If operations personnel are suitably trained and motivated, they will respond positively to the needs of the environment.

"Hobbyist software tends to be better written than commercial programs." — Packet-switching expert Paul Baron.

In the world of the expert, perhaps the one-eyed naïve never could be king!

DAVE HARAN

Department of Special Research, University Hospital of South Manchester.

## How to get positive response from 'ops'

WHY all this fuss about operators' responsiveness to the computing environment? Is it the BCS-orientated where some "egg-head" is about to starle the industry regarding the importance of successful computer operations? It may even be that this concept has finally sunk in after 15 years.

After 12 years in this field, and having progressed through to almost every type of operation, I can say with profound conviction that it will take a very long time to change the present situation.

This is primarily due to the basic fact that there exists a dividing line between systems/programming and operations.

The chief culprit in this situation is the data processing manager. He may well have to bolster confidence and ego in his "prized" departments, but in this process adopts the "they are your minions" principle. Can this approach be correct?

Several years ago I laboured the point in these columns about the "team work" concept in computer departments only to obtain several snide, sarcastic egg-headed comments.

The rude awakening has now dawned that with the more sophisticated systems, these egg-heads have regrettably discovered that the operations department has become even more important now.

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factors. Poor documentation for data prep and program fault diagnosis is another weak area. Proper training facilities are important. Shift working conditions are very important. Maybe some of these egg-heads who have never worked after 5pm, probably don't know what the term "shift working conditions" means.

At one large US-owned company, the computing area was deemed to be massive. Nearly 30 staff worked on each shift, this comprised 15 shifts in the week and invariably six at weekends. There was one coffee machine (not free) which was generally out of action after 5pm. The company was beset with low staff morale and absenteeism. Yes, it was indeed very difficult to understand why they were beset by such problems. One would have thought that the Americans had never heard about psychology and motivation.

Statistically, all operations departments cannot be as gung (or can they?), as there must be some managements endowed with some common sense.

This is the only recipe for a successful department and where throughput could be at its maximum efficiency.

Surely it is about time the BCS

realised that there just could be a professional status to computer operations and recognise this within its (full) membership status. Maybe it is waiting for a White Paper on the matter?

A. N. BALGOBIN

Rushall, West Midlands.

Inevitably one will only get what one is prepared to put into a department — this is the crux of my contention.

Thus, because of this apathetic attitude, the accounting and personnel departments should want to start "asking questions." Such matters as high staff turnover, expensive re-runs — both machine and stationery — and user inconvenience should prove to be very interesting talking points.

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## Reorganising UK telecommunications industry: a poser for the working party

THE thorny problem of how to reorganise the UK telecommunications industry is being discussed by one of the government's 40 sector working parties. These are tripartite talking shops set up under the auspices of the National Economic Development Office and include representatives of government departments, unions, and industry.

It argued that such a company was necessary to enable the British industry to compete effectively with giants like GTE of the US in world markets.

There is, therefore, a need to reduce the capacity within the telephone exchange manufacturing industry, which principally involves three companies, GEC, Plessey and the ITT subsidiary STC.

Plessey has been hit hard by cutbacks in orders from the Post Office. GEC, on the other hand, has net cash assets of £470 million, and has said in the past that it would welcome the formation of a single British telecommunications manufacturing company, by merging the interests of the three existing sup-

pliers. It believes that such a company was necessary to enable the British industry to compete effectively with giants like GTE of the US in world markets.

The government would be unhappy to see Plessey fall into the hands of the American ITT, but some solution might be found where ITT sold a proportion of the STC equity to UK investors, as it has done in Germany with its SEL subsidiary.

Industry sources indicate that the main value of the sector working parties will be the personal contacts which have been made with individuals in government departments.

Plessey has reported results for the year to March 31, 1977, in which turnover grew 16 per cent to £569 million, of which 51 per cent was done overseas.

Exports from the UK were up 36 per cent at £94 million, and net profit after extraordinary items was up 21 per cent at £12,437,000. The main extraordinary item was a loss of £7,720,000 for the costs associated with closing telecommunications plants following the cut-back in Post Office ordering.

Pre-tax profit was up 14 per cent to £39.8 million.

— Tim Palmer

## MDS holds takeover talks

MDS in the US is holding preliminary takeover discussions with Keuffel and Esser, a precision engineering manufacturer with an annual turnover of about \$90 million.

Keuffel and Esser is based at Morristown, New Jersey, near to MDS headquarters at Parsippany. It builds reprographic, drawing office and surveying equipment. In the first half of this year, it made \$337,000 net profit on sales of \$45 million.

MDS turnover in its 1977 financial year ended April 30, 1977, in which turnover grew 16 per cent to £569 million, of which 51 per cent was done overseas.

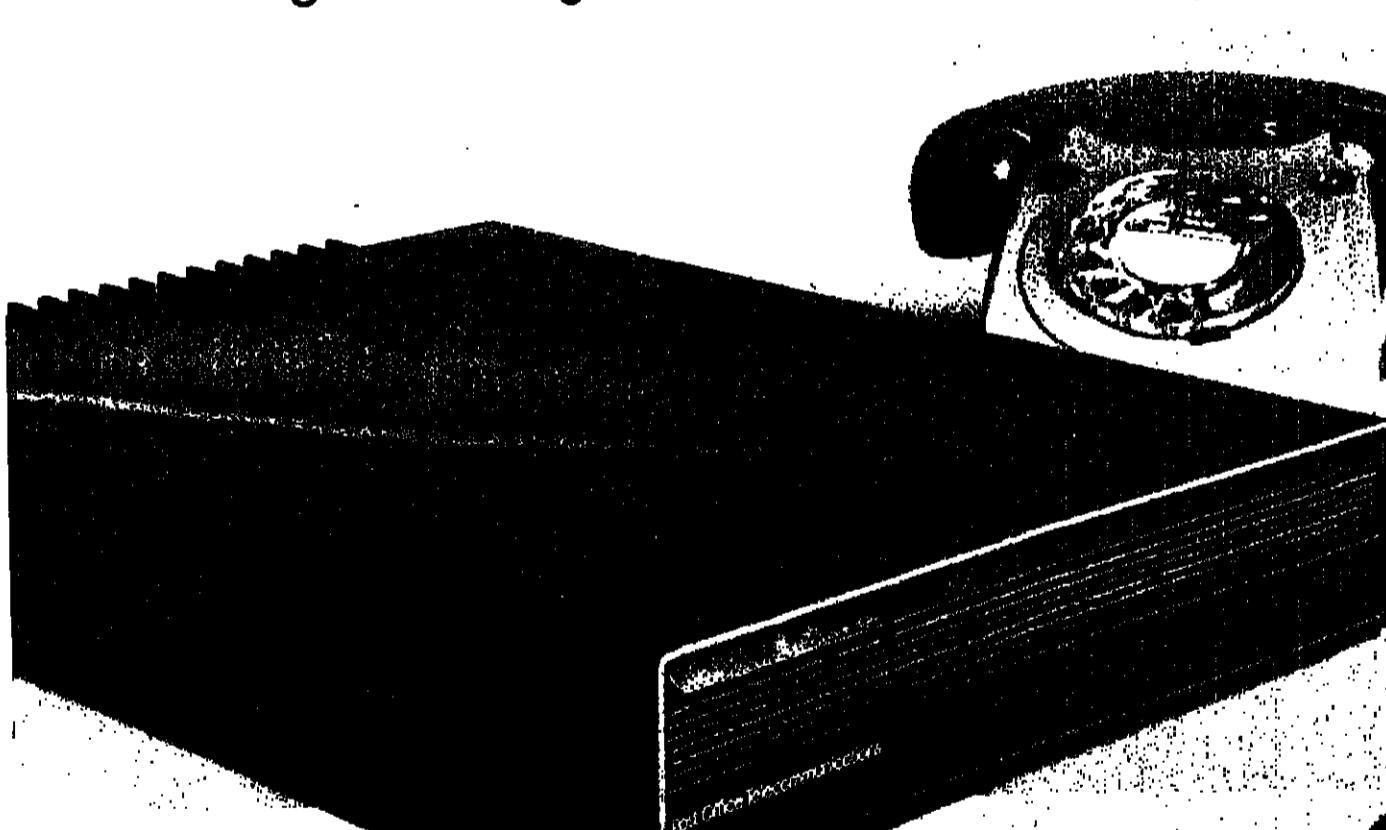
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MDS bank debt at the end of fiscal 1977, at \$33 million, was \$25 million lower than in the year before.

— Tim Palmer

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## MICHE'S PRIVATEVIEW

Russian robots  
and other  
Eastern progress



Last week's IFIP congress re-emphasised the gathering revolution in information technology that is likely to create considerable shake-up in intellectual, social and economic life throughout the world.

Starting this week, Professor Donald Michie, head of the Machine Intelligence Department at Edinburgh University, will be providing a fortnightly Private view on research advances that will influence the course of this revolution.

Donald Michie was one of the Bletchley Park team which worked on Colossus, the codebreaking machine that is now regarded as the world's first electronic computer (CW, July 28).

In 1950 at Edinburgh University Michie began studies of experimental programming unit which developed the POP-2 language, and he played a leading role in developing Edinburgh's computer-controlled robot FREDDY. He became

THE Western world usually assumes that it is light years ahead of Eastern Europe in all aspects of computer development.

While this may be true in the hardware field in particular, at a recent conference on machine intelligence at Ropino, near Leningrad, a number of Soviet contributions were of a quality which left many Westerners, to misquote James Bond, stirred if not shaken.

Distinguished Russian work in robotics is not confined to Moscow. Valentin Ponomarov's Leningrad laboratory has an interesting approach to database design for real time robots, as outlined to us by his co-worker Felix Kulakov who also has a book just published on underwater robotics. Intercommunication between modules is based on Dijkstra semaphores.

Of course JPL keeps its eye on this remarkable exercise, and so should the rest of us. Mars is not the only awkward terrain where Man may need to navigate.

A OLS spokesman said that although Fortran-10 was introduced several months ago it was company policy to wait until all bugs were cleared before implementing a new language.

The conference, which I co-chaired with Academician G. S. Pospelov, was the Ninth International Machine Intelligence Workshop, and it amply proved that it is no longer only in the Western world that we see laboratories "striving to develop computers with as much intelligence as human beings" to use the colourful phrase used by The Times to describe research into machine intelligence.

Let us first take robotics, a field in which the US President, Jimmy Carter, has recently raised the stakes with a \$6million hand-out to Pasadena's Jet Propulsion Laboratory. Their Mars Rover Intelligent Exploratory Vehicle is to be operational by the mid-1980s. Why intelligent? Might it not be enough for it to be just plain clever, or even dumb but dogged?

Well, you would then have to radio-control it from Earth, telling it at each step what to do next. But since radio signals take half an hour or so to travel the distance, this is not practicable.

Radio signals, yes, but only to convey strategic commands. "Go behind the large triangular rock and collect a soil sample."

Tactical ways and means are for the on-board computing system to work out. Hence the need for it to be reasonably "intelligent".

Any other motor racing problem on Mars? The terrain certainly looks stony, with crevasses and boulders here and there. JPL have put their trust in wheels, and I wish them the best of luck. But at Repino we were reminded that legs are not such a bad idea after all.

The latest film from Moscow

*Donald Michie*

## Disc-space control package for Honeywell Level 66

LATEST package in the disc-space control market has been developed by Trident Computer Services, of Camberley, Surrey and mainframes market. Trident's Filcon is aimed at Honeywell Level 66 machines.

A minimum size is initially specified for sequential files under 1000 bytes. The Geos operating system, increase in the amount of data above this limit pushes the limit up; but with subsequent decrease, the limit does not move back again.

Filcon reduces the size of the file to that of the actual data content, freeing the empty space. This also handles the case where the initial minimum size specified was too large.

# SOFTWARE FILE

## EDITED BY STEPHEN BELL

### Fortran on OLS bureau enhanced

AN enhanced version of Digital Equipment's Fortran is now available in the UK on the DECSYSTEM-10s run by OLS Computer Services. The OLS enhancements include advanced string and array handling and new printout formats for business applications.

OLS said that its array handling facility will enable the user to specify an array size at run time, thus saving memory by using no more than is needed.

A character string can be written in to a variable. And the report formatting facilities make it easy to print to book keeping conventions such as brackets around negative amounts of money.

OLS has also developed interfaces between Fortran-10 and its applications products including its Information Management system Oliver.

An OLS spokesman said that although Fortran-10 was introduced several months ago it was company policy to wait until all bugs were cleared before implementing a new language.

The library was originally developed by five UK universities, but last year the group became a non-profit making company supported largely by the Department of Education and Science's Computer Board (CW, May 20, 1976).

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### NAG library boosts for Prime 300s

THREE major software products — the Numerical Algorithms Group library of numerical subroutines and compilers for Algol 60 and Coral 66 — have been announced by Prime Computer. The NAG enhancements include advanced string and array handling and new printout formats for business applications.

Output is available. Full input and output facilities will be available very soon and future extensions will include double length variables, direct compilation to binary with optional generation of assembler code and a re-entrant compiler gene-

rating re-entrant code.

Prime's software offering could be further enhanced shortly by an API system. A company said that API will be considered initially for the Scandinavian market.

Approved machines for Coral

The language is already being used by four Prime sites, including Computer Aided Design Centre in Cambridge. Coral costs £1,000 per machine and is fully supported by Prime.

THE orientation of the IFIP congress towards the implications of computing for humanity at large did not ignore the important sector of the system.

Management system Panvalat.

The package, which now has 3,500 users around the world, was chosen after a detailed evaluation of several other systems including Datasolve's own Program Maintenance System.

Panvalat has been implemented on Datasolve's IBM 370 mainframes at Oxford Circus in central London, because, said the company, most of its future development work will be done there.

### Panvalat's prestige customer

A PRESTIGE customer, in the form of BOC's bureau subsidiary Datasolve, has been won by Panvalat for its program library management system Panvalat.

The package, which now has 3,500 users around the world, was chosen after a detailed evaluation of several other systems including Datasolve's own Program Maintenance System.

They have their own problems in interacting both with the machine and with the non-DP-oriented personnel who request development of programs.

W. Hetzel, of the Blue Cross medical insurance company, felt that such rigidity could be used by the developer as an excuse for a refusal to adapt.

Discussion of change raised a question treated in Programmer Notes (CW, July 21); is it better to alter a program or completely rewrite it? It was accepted that discarding of old programs could be more widely practised. "If programs are not thrown away,"

many fronts of attack in trying to improve the situation, but we are not even sure of the nature of the problem. Are some of our "cures" only concealment of the symptoms?" he asked. "Is radical surgery necessary?"

Consultant Tom Gibb, who will be starting a regular column in Computer Weekly next week, was particularly dismissive of some current techniques.

"We worship techniques like structured programming, without having quantified its effect," he said. "A religion is all right for a stable environment, but software development is not such an environment."

Along with development of quantification methods for such desirable attributes as maintainability, flexibility and portability, one should keep clearly

The chief impetus behind this trend is the increasing cost of the labour-intensive task of software maintenance. With improved communication of initial program requirements and improved capabilities for testing or proving the correctness of programs, software maintenance effort and expenditure could diminish drastically.

The lines for a panel discussion on programming management on the first day of the congress were laid down by Michael Jackson. Although not present himself, he had given all speakers some ideas on which to base their remarks.

The state of the art in software development is not satisfactory, said Jackson. "There are already

station's records for the data required and, if it is not found, looks at the records for other stations. It is claimed to locate any item within five seconds.

With increasing requests for the present system is becoming overloaded, so the RAF decided to install a third 4/72 along with the others at the Supply Centre in Hendon, and to request appropriate modification of the software. The machine will share the real time in a dual processor configuration.

The new software, known as Dual Monitor, will retain the same mode of operation, database management functions and user interface as the present Monitor. It is expected to be up and running within the next few months.

THE qualifications needed by programmers are often

brought up by Programmer Notes readers, but while these discussions are usually

about the merits of university degrees, one reader this week says that a few years as a computer operator are probably the best qualification of all.

Laura Coaker, from Bristol, an operator turned programmer, says the advantages of a trainee programmer with operating experience are that he can visualise the computer and the operations department; he is familiar with the operating system; he knows to a certain extent how best to use the computer; and he knows the common programming errors which cause operating problems.

"If this became the case, fewer operators would be lost. And the better feeling between operators and programmers that this interaction produced, and the greater understanding of the computer which would develop, would surely benefit all computer staff and might even increase efficiency."

Coaker gives a word of warning, however, to operators considering a move to programming. Although she had sufficient qualifications for the move it was not an easy step to take.

How many other programmers have come from operating? What problems have you found? And when it comes to the promotion stakes, do graduates or people with better academic qualifications get preference? Programmer Notes would like to hear.

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## Microprocessor News

### Forth launches high level programming for CDP/1802 minis

A HIGH level programming technique known as Forth is now available for use with the RCA Solid State CDP1802 microprocessor family.

Developed by Forth Inc of Manhattan Beach, California the language overcomes some of the objections levelled at high-level languages, especially that they are too clumsy and expensive for use with microprocessors, by making efficient use of system memory and time.

To use Forth, a programmer defines an application-oriented vocabulary of commands which is maintained in a store, such as a floppy disc, in source form. The language is organised into a dictionary occupying almost all the memory used by the program. Words can be added by "defining words," which describes the new word in terms of previously defined words.

One such word is "Code," which indicates that the word following is to be defined by machine instructions, and will cause specified machine instructions to be executed.

Forth has two interpreters. The first is high-level. It reads a

word from the terminal, searches the dictionary for it, and executes the entry it finds. The second is a low-level interpreter, which executes a word defined in terms of other words. This offers advantages in terms of speed, independence of the machine, and the fact that it interprets compact definitions.

Unlike conventional high-level languages such as Fortran, Basic, and PLM, Forth is not syntax-oriented. As many microprocessor users will have prior programming experience both Forth and RCA feel that this freedom from syntax will prove welcome.

Two levels of operation can be supported with Forth. It can be run with the RCA COSMAC development system, or as a cross-compiled version that has most of the support functions stripped away.

With the former, it is possible not only to program but also to test device drivers interactively in real time. Following this route, target systems can be developed in cross-compiled form after testing on a development system.

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### Motorola to release industrial control chip

DUE to be released next month are a 1-bit industrial control chip and two 4-bit organised bit slices from Motorola.

The controller, designated MC14500, has been specifically designed to meet the need for simple, sequentially-based industrial applications. Manufactured using the CMOS process to provide a lower power requirement, the chip utilises a single 5 volt power supply and operates on a clock frequency of 50 nanoseconds.

Both slices are intended primarily as development systems to be run on the Exorcisor development equipment. By using a modular approach to instructions, based on 4-bit unit, variable-length instructions can be used to allow the emulation of other computer systems.

Up to 16 logic instructions and one conditional jump are provided, operating on a 4-bit instruction code. The chip can execute one instruction per clock period and, to save on

program memory, uses a hardware flag for the conditional jump sequence.

The two bit slices are the MC2900 — produced as a second source to the Advanced Micro Devices AMD 2900 — and the MC10800, the first to be produced using Motorola's MECL bipolar process. The MC10800 has an instruction cycle time of 50 nanoseconds.

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### Teach-in for the bosses

FOR managers with little or no experience in electronics or microcomputing, Mektronic Consultants have launched a "Teach-in" aimed at clarifying the fundamentals of microprocessing.

Further details of these £100 teach-ins can be obtained from Mektronic at Hinning House, 41 South Lane, Astley, Manchester, M23 7DE. Tel: Atherton (052-34) 68740.

By the end of the day, participants should be fully

### EPROM programmer

AN EPROM programmer that can operate either as a stand-alone unit, or as part of the QMS Microcomputer System is available from Quardon Electronics.

Designed as a single printed circuit board, the unit operates with either the 2708 1K x 8-bit EPROM or the 2K x 8-bit TMS2716 device.

Known as the QMSOO-1408, the programmer is equipped with a switching regulator to

generate the necessary 28 volt programming voltage from standard power supplies. It is also fitted with 2K bytes of RAM to act as a buffer store.

When used with the QMS microcomputer, the CPU's ROM monitor program can be used to move blocks of data into the RAM prior to programming and then subsequently verify that the EPROM has been correctly programmed.

Burr-Brown cuts its prices

PRICE cuts have been made by Burr-Brown in their range of peripheral I/O devices for the microcomputer systems business. The MP8408 8-channel, 8-bit analogue input board for the Intel SBC and MDS systems has been reduced from £544 to £290 while the MP112 2-channel output module for the Motorola 6800, the Fairchild 68 and other microprocessors, is now available for £29.10.

Reductions have also been made in the company's range of general purpose analogue-to-digital and digital-to-analogue converters, by amounts varying between eight and 30 per cent.

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# FILE DESIGN

## Part 8

By Owen Hanson

### Special purpose files

SPECIAL purpose files can be divided into two groups. The first includes those files designed by users to meet their own specific needs, while the second is made up of specialist software provided by manufacturers or software houses to handle applications such as production planning.

An example of user-designed files is the case where there is a requirement for very rapid running of a sequential file, and processing times are significant, so the gap between records does not give sufficient time. Usually this will lead to a number of lost revolutions; this can be avoided by arranging the file as shown in Figure 1.

In this case the dummy records are made just long enough to allow processing and writing of the first record before the second becomes available, processing and writing of the second before the third becomes available and so on.

Double buffering allows more time for processing and writing records, and cuts down the amount of space needed for dummy records. This is also shown in Figure 1. They still waste a good deal of direct access storage, however, which has led to a further development of the technique.

Spiral files are arranged as shown in Figure 2. The first record is stored at the start of the first track, the second is placed far enough along the second track to ensure that it is not read until the processing and writing back of Record 1 is complete. Records are arranged on descending tracks in sequence until a record is reached that can be "fitted into" Track 1 closely following Record 1. In Figure 2 this is Record 8, and the spiral is repeated from this point.

The packing of data records that can be achieved is usually about 90%, and only in very fortunate cases can all the space on direct access storage be utilised.

Files designed on these or similar principles can produce very short run times, as rotational delays are virtually eliminated. However, such files suffer from a number of serious drawbacks.

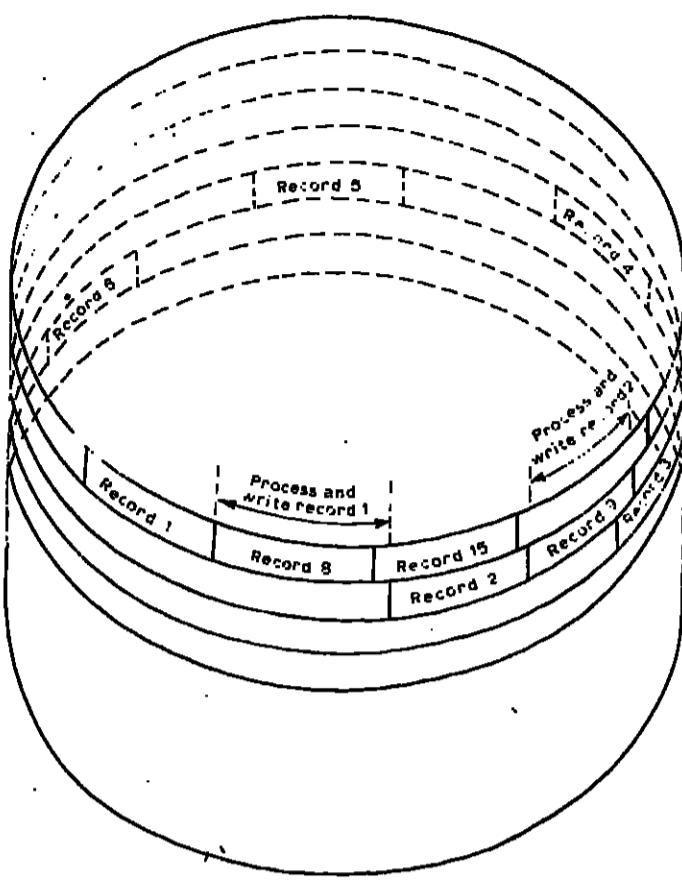


Figure 1. The arrangement of data records and dummy records on a track to ensure that no time is wasted due to rotational delay. If double buffers are used, Record 1 is available for processing and writing back until Record 3 is read.

### SOFTWARE MADE IN SWITZERLAND

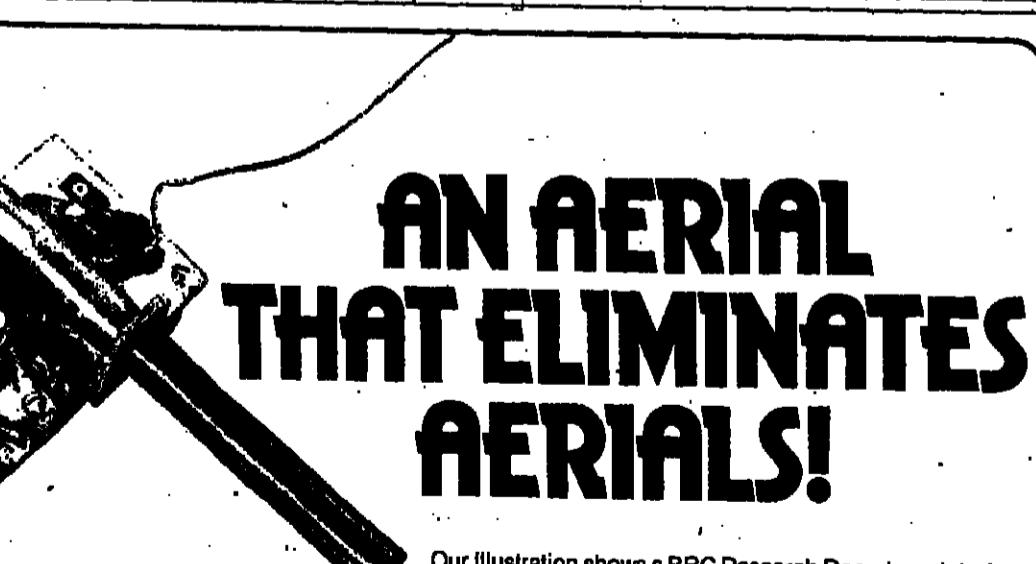


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## wireless world

Electronics • Television • Radio • Audio

September Issue

Out now 40p

By Owen Hanson

### NEWS IN BRIEF

#### Fifty lose print jobs

ABOUT 50 production workers at Scottish and Universal Newspapers, one of Scotland's biggest newspaper groups, to lose their jobs following a decision to shut three printing centres at Paisley, Kilmarnock, and Ayr and move to a £1 million computerised plant at Irina New Town, in Ayrshire.

The new plant will have photo-typesetting and web-off facilities.

REDIFON Flight Simulation has sold its second civilian helicopter simulator to Helicopter Service A/S, of Stavanger, Norway. Based on a Redifon 2000 computer, the Sikorsky S-61 helicopter simulator will incorporate Novoview SPI night and dusk visual graphics and a six-axis motion system.

TWO GEC 2050 RJE terminals have been installed by British Airways at Heathrow Airport. They are used for communicating with the IBM 370/390 at Bodicea House.

THE US-based manufacturer of magnetic tape drives for mini-computers, Digi-Data, has set up two subsidiaries in Europe. These are based at Brugg in Switzerland and at Maldenhead in UK. The Swiss company will sell directly in Switzerland and Germany and through distributors in France, Italy and Spain. The UK subsidiary will control distributors in Benelux and Scandinavia.

AN online version of SECURE, financial computer system originally designed by Lazar Brothers to handle contract calculation and maintenance and accounting for clients' investment portfolios, is to be marketed by CMG (City of London).

A TOTAL of 2,400 Avery 1750 digital weight scales have been ordered by Woolworths and Dethwursts from W & T Avery.

A DATABANK proposed by the Confederation of British Industry for use in advising companies on the best level for wage settlements during the next round of wage negotiations is to be a completely manual system, and according to the CBI, it will be more a counselling service than a monitoring one.

Management see WIP as capital and added value lying idle in the factory. The individual machine-minder sees it as his guarantee of there being a job for him next week. Unless he is convinced a system that cuts WIP will benefit him, shop-floor morale is endangered by such a system.

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One company that installed CLASS found that initial reductions in WIP were followed by a general reduction in productivity followed by restoration of WIP to levels similar to those that applied before CLASS was installed.

Several cycles of this type were followed by the removal of the CLASS program from the installation. However, the failure was not a technical one. The systems analysts responsible for the program had not communicated with shop-floor workers, and failure was the price of this omission.

The file designer is not only responsible for the technical side of his work. In addition, he must allow for its impact on other members of the organisation, and ensure that they expect, and accept, the changes his work will cause.

A GEC 4070 processor, shortly to be installed at the GEC Technological Centre in Weybridge, is equipped with 16 kilobytes of core memory, costing over £60,000. It will replace the existing 8k system.

# COMPUTERS AND ACCOUNTANT

Accountancy, one of the most respected professions, is traditionally linked with book-keeping — looking after the ledgers, working out the payroll.

But the introduction of computers not only makes the accountant's job easier in these traditional areas but opens new paths in the fields of financial modelling, corporate planning and costing.

As John Ambler says in this opening article, accountancy departments are ideally suited to computing because they are already well structured,

disciplined and used to working to high levels of accuracy.

This supplement looks at old and new applications, for computers in accountancy departments. Ambler sets the scene with a look at the growth of the use of computers by accountants, a review of some of the common applications and a glimpse of the future, while other writers describe systems handling applications ranging from pensions to modelling and royalties for pop groups.

# Applications wheel turns full circle

By John Ambler

THOSE of us with a long tooth in computing can recall with ease — and occasionally affection — those far off days when the computer was the accountant's toy. The financial director, or chief accountant was considered the "natural" man to head the computing activity: as one MD said, "he is the figure man isn't he?" as if this was all the justification needed.

It was true in those days that much of the work the computer tackled was accounting: payroll, ledgers, costing and the like. Of course, the real reasons for computerising these tasks were rarely advanced: they were already structured, disciplined activities; the accountant's department had become naturally used to working accurately and against time pressures; and the pay-offs associated with large staffs and volumes and non-fragmented jobs were substantial.

The user systems analyst responsible for such an application will be more involved in choice of alternatives than in true file design. Each manufacturer offers a distinctive set of products, and familiarity with a given package will allow the user to choose a minimum set of options that meet his requirements.

Variation of these options will allow an application to be effectively tuned, but it is important to start from a known base, and the minimum option set is the most convenient.

A serious trap lies in wait for the systems analyst here. It is best illustrated by an example.

CLASS, Capacity Loading and Scheduling System, is used to

schedule work more efficiently, and to reduce the amount of work-in-progress, WIP, on the shop-floor.

Management see WIP as capital and added value lying idle in the factory. The individual machine-minder sees it as his guarantee of there being a job for him next week. Unless he is convinced a system that cuts WIP will benefit him, shop-floor morale is endangered by such a system.

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and the like.

In between, there is enormous scope to profit from the use of models of all kinds.

For a trading organisation, the applications are fairly standard:

- Payroll
- purchase ledger
- sales ledger (including perhaps order entry and probably invoicing)
- general ledger (including budgets, overhead control, etc)
- fixed asset accounting

In his ten years at PA Computers and Telecommunications John Ambler has specialised in the application of computers to finance and accountancy. In 1971, he served on the government working party on the design of a computerised system for PAYE and was on the accounting working party studying the implications of VAT for the Institute of Cost and Management Accountants.

Ambler is a Fellow of the Institute of Cost and Management Accountants, a holder of the joint diploma for Management Accounting and Fellow of the British Computer Society.

Costing is the area for excellence where the good systems designer comes into his own. It is one of the paradoxes of a good costing system that the main part of the effort has nothing to do with accounting: it is entirely dependent on product structure and updating.

A product specification file may be turned over as quickly as every three months by new models and modifications. Adding standard and "current" costs to a file with such a high degree of volatility is reminiscent of jumping from one moving roundabout to another.

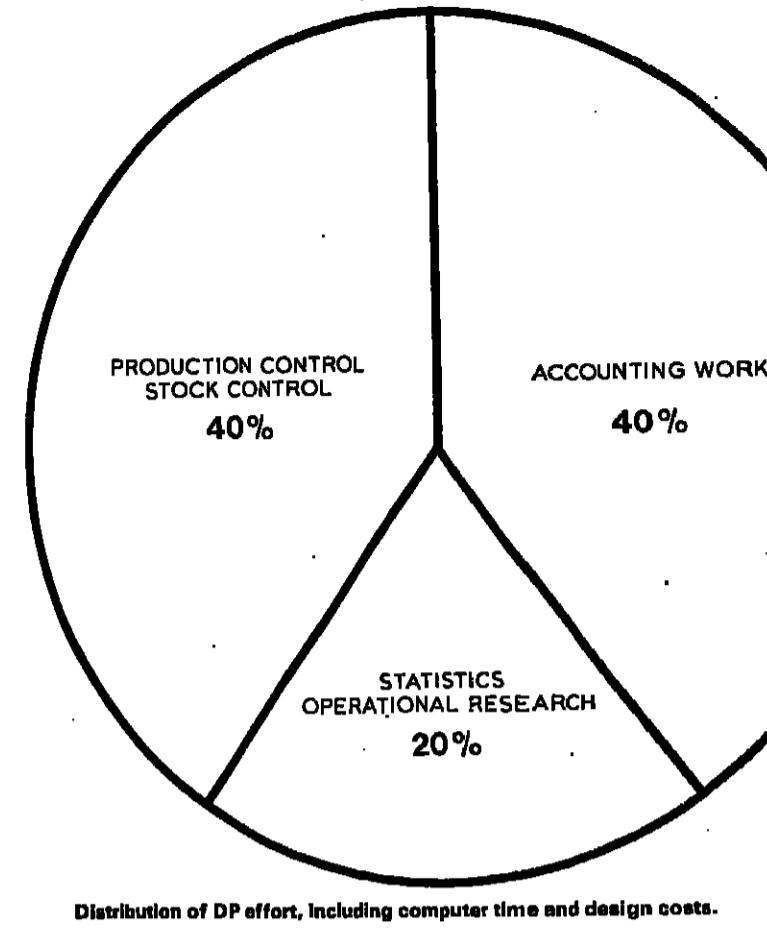
Finally, models. These can vary in size from the five line

Basic program to the most enormous and complex matrix-based systems. However, they are tailor-made to solve a problem identified and specified by an accountant.

The analysis so far has been applications oriented. An equally interesting way of dividing the market is by user.

At the top are, of course, the displaced manual procedures.

General ledger can cover anything from the one code trial balance system to the mainframe one which reports actuals versus



Distribution of DP effort, including computer time and design costs.

from one occupation to the other — and back again — is a natural one, and it could well be on the increase.

Accountancy will continue to be an activity which is at once both nearer the detail user (itself a guarantee of above average success) and the strategy making part of the organisation structure.

Finally, the accountant's dominant position in "information processing" is enhanced by the use of DP, not fragmented.

While there are not exactly new applications, there are new starts to old approaches and systems why.

Modelling is one area where the sky appears to be the limit: here the accountant, the OR man, and the DP specialist can usefully collaborate.

In the Miles Roman sample, two thirds of firms had computerised nominal ledgers, and only 40% cost ledgers. Existing users have a long way to go.

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WHEN pension schemes started, they were, looking back, very simple to run. As time passed, sophistication crept in. Design of benefits became increasingly sophisticated and tax concessions increased. Simultaneously, governments became more concerned about pensions because of social implications.

Today running a pension scheme can be a complicated business. Not only is it necessary to have at your fingertips details about current members and current benefits, but also information about previous schemes in which members were involved and details of persons who have retired or left your service.

Quite clearly the storage and retrieval of large blocks of information is ideally suited to computers. Sedgwick Forbes Employee Benefits Consultants, a specialist company within the Sedgwick Forbes Insurance broking group dealing with pensions and other employee benefits, has a computerised administration system for administering pension schemes, both for its own use, and for sale for use by other companies.

They had for some time administered pension schemes on a manual basis. There was no file maintained with all the data held and regularly updated. The system worked effectively, but as reports with updated infor-

# Computerised pensions administration

By Gershon Lipschitz

Department of Health and Social Security, Sedgwick Forbes, in common with most other consultants, was sceptical about how quickly this data would be forthcoming, and so decided that they must be in a position to produce the information for themselves.

Because of time restrictions — the system would have to be operational by the end of 1977 at the latest — it would have made sense to buy a package, but no such package existed at the time. So, in conjunction with Pensions and Insurance Computer Services — a special pensions software house — a system was designed and is now operational.

There were a number of problems to overcome at the design stage. From the pension

point of view, the system had to be broad based enough to be able to store information for a number of differing pension schemes, for Sedgwick Forbes' own use, and be adaptable to other people's pension schemes. In order to obtain complete flexibility the concept of a "scheme module" was created. The "scheme module" described the features special to each scheme and is accessible to a number of different programs. One module is written for each scheme. The result is a system wider than one purely parameter driven.

Each member can have a record which, if all possible variations are present, is quite long. By putting all the information on file, all data can be used because it is readily accessible. This is a very useful tool, not only for pension administrators but, if the necessary details are on file, and there is room for them, for personnel departments too. This is an area which is not often appreciated, and one central source of group personnel data is often ignored, or its usefulness goes unappreciated.

The system differs from the usual insurance company administration, which is normally geared to the features of that company's operations only. It is fair to say that any pension scheme's records can be stored, retrieved and manipulated on the Sedgwick Forbes' system. This is its unique feature.

There were also technical problems. Should the files have random access, or should it be accessed sequentially? There are advantages in both but it was eventually decided that operating in sequence was the answer. Should files be held on tape or disc?

During the writing of the system, a major job, it became apparent that the system would be larger than originally envisaged. When completed it contained over 20,000 procedure division statements.

The production of individual employee benefit statement is a natural by-product of such a system. These are statements issued on a regular basis which inform the member of his own benefits under the scheme. This is not in fact done directly by the system itself though, of course. All information necessary to run a pension scheme is held on file. Collecting the data and then ensuring its accuracy is always a problem. It is amazing how much information which should be known, is not available.

There are a number of error indicators and warnings thrown up in editing input, some of which are generalised (for example, that a supposed month numeral is in the range 1-12) and some of which are scheme specific (a certain date, say the date of entry to a scheme must be after, say, January 1, 1980).

Future developments are already planned. April 1978 is a watershed in the pension world. Thereafter, the system will be extended to do benefit calculations for individual members at the time of entry, withdrawal or death. It will be desirable to have a standardised interface with the main payroll systems — Unilever and Q-Pack. From there, we know?

This system has been written for an IBM machine in Cobol but can naturally be converted to cover other machines.



Running a pension scheme can be a complicated business, says Gershon Lipschitz, who is assistant director of Sedgwick Forbes Employee Benefits Consultants.

NEW manufacturing and business methods and changing patterns of employment could create new opportunities for computer assisted learning, but unless there is a dramatic change in organisations' attitude to CAL, industry will lag far behind education and military training in these methods in the 1980s.

So says a report\* on computers in industrial training and management development, produced by the National Development Programme in Computer Assisted Learning.

The problem, said the report, is that industrial training has relatively little experience of CAL and has hardly begun to exploit its potential.

The report gives several reasons for this: Industrial training is a vast unco-ordinated field where innovations cannot be spread easily. Early exaggerated claims that CAL could replace teachers have created suspicion of these methods. Few training departments have enough computing experience. And commercial interests such as demand for minimum costs and immediate results, together with the existence of cheap audio-visual aids, make the current attitude to CAL "not too surprising".

The reasons add up to lack of process control skills as automation and sophisticated technology change the manufacturing and production industries.

At the same time, as manpower becomes more expensive, there is a need for training systems which develop individual abilities fully, and quickly react to weaknesses to avoid wasted effort.

In all these areas CAL was proven through systems deve-

loped in universities, colleges and military training establishments.

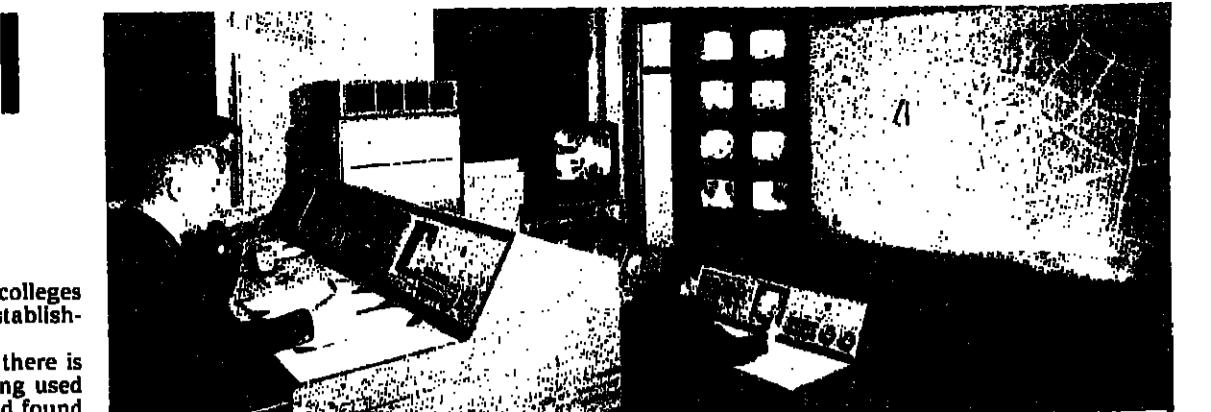
And, says the report, there is no evidence of CAL being used on an intensive scale and found inappropriate.

Criticism of the report has come from Neil Spoonley, who is responsible for marketing Control Data's Plato computer assisted instruction system in the UK.

He said it ignored all the US experience in CAL and only made brief mention of systems like Plato and IBM's Interactive Training System.

Roger Miles, assistant director of the national programme and author of the report, said there was very little published material on US systems and that no data on their cost-effectiveness was available.

\* Computers in Industrial Training and Management Development in the 1980s, by Roger Miles, 37 pp. 75p. National Development Programme in Computer Assisted Learning, 37-41 Mortimer Street, London W1N 7RJ.



LB1-2 in an experiment in dynamic traffic control. The mini is located in a caravan near road junctions outside Liverpool begin to be brought online.

Based on a Plessey XL8 central processor with Digital Equipment PDP 11/20s as frontends and four PDP 11/08 as satellites, the system at present controls over 250 sets of traffic lights in Liverpool. At busy junctions and bottlenecks there is TV camera surveillance which enables the operators in the central control room (pictured above) to adjust the system to cope with traffic peaks and holdups.

The second phase will extend traffic light control to Birkenhead, the Wirral, Bootle, St Helens, Southport and Mersey.

To improve the system Merseyside County Council is using a Computer Automation Alpha

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## Wang names Dublin firm as distributor

FOUNDED two years ago to provide support for the Singer Business Machines base in the Irish Republic, Control Systems Ltd of Dublin has now been appointed Irish distributor for

the Wang line of small systems. Spearheading the market attack is the Wang 2200 desktop display computer, which has already scored sales of over 8,000 in the rest of the EEC.

# COMPEC'77 keeps on getting bigger!

Demand for space is so heavy that we have persuaded the GLC to let us use extra space at the Wembley Centre, and that gives us 40 stands in addition to the original 180. That takes care of the waiting list and gives us a few — a very few — spare stands on offer. Telephone Chris Timmins at 01-261 8437 to reserve one of them.

COMPEC '77 — seventh year of the specialist computer, terminals, microprocessors, systems and hardware exhibition.

Organised for the sponsors by Life Promotions Ltd, Room 821, Dorsier House, Stamford Street, London, SE1 9LU.

## 'Set up a national CAL centre' call

NEW manufacturing and business methods and changing patterns of employment could create new opportunities for computer assisted learning, but unless there is a dramatic change in organisations' attitude to CAL, industry will lag far behind education and military training in these methods in the 1980s.

The need for CAL techniques is clear, according to the report. There is a growing use of computers in industry, a greater need for planning, fault finding and problem solving skills, and a demand for maintenance and

knowledge of the potential of CAL, and the report calls for the creation of a national centre to collect and hand out information and, if enough money is available, to pilot applications and co-ordinate research.

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### Plato on show

The computer aided instruction system, Plato, developed by Control

Data, will be available for demon-

strations in the UK in October. And next year a Cyber mainframe will be installed in Brussels to handle a European service. UK marketing is being handled by Neil Spoonley, formerly director of the University of London Computer Centre.

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At the same time, as manpower becomes more expensive, there is a need for training systems which develop individual abilities fully, and quickly react to weaknesses to avoid wasted effort.

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### Go-ahead for AT&T switched data service

THE US Federal Communications Commission has authorised AT&T to go ahead with a switched data service which would compete with the services offered by "value-added" carriers like Telenet.

Called Dataphone Switched Digital Service, DSDS, the AT&T system would link 27 cities carrying data at 56K baud only.

DSDS is unrelated to the Bell Data Network which AT&T is planning. This would allow users to communicate with the network using a very high level

language, and would involve AT&T in large amounts of DP.

Contesting AT&T's application for DSDS, Telenet asked that the company be required to set up a separate subsidiary to run it. The FCC ruled that this would be inappropriate for one service, but is considering whether AT&T should form a separate subsidiary to handle all its data services.

"Our submission was not

rejected," a Telenet spokesman told Computer Weekly. "We believe that the FCC is moving in the right direction."

### Nixdorf plans D116 replacement to be made by US subsidiary

PREPARING for the day when Data General phases out production of the D116 minicomputer — expected to occur once existing orders are completed — Nixdorf is planning to use its newly acquired US subsidiary, Entrex, Corp of Burlington, Massachusetts to manufacture an alternative to the D116.

Entrex manufactures key-to-disc systems based on the D116 and Nixdorf also uses the Nixdorf-designed mini to determine whether it has grounds for a similar law suit against Nixdorf.

Uncertainty over the future of

### Zilog software package

ZILOG has introduced a complete graphics software package for the Z-80 microcomputer system, or any system using the Z-80 based family of microcomputer boards.

It offers the generation, printing and display of complex images comprising any combination of vectors, points and variable location characters with user-definable shapes and sizes.

For hard copy output, the package is designed for use with a low cost printer, having a resolution of 960 and 288 points in X and Y respectively.

### Networks explained

A TEACHING package on networks, designed for self instruction or for a classroom course, has been produced by the National Computing Centre.

The package comprises a complete set of lecture notes and visual aids. The lecture notes include indications of the expected responses from stu-

dents, and advise the teacher when to show visual aids, use the blackboard and issue exercises.

It is designed for use with a low cost printer, having a resolution of 960 and 288 points in X and Y respectively.

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## BOOKS

## Guide to better standard setting

Systems and programming standards, by Susan Woodbridge. 189pp. £10.50. Petrocelli/Charter Computer Science Series, distributed in the UK by Input Two-Nine.

THIS book is intended to help the data processing practitioner to introduce, or improve, the standards used in his department. The author is a lecturer and her book reads as if intended as a series of lectures.

An artificial distinction is drawn between "operating standards" (described as production oriented) and "development standards," which in the reviewer's opinion also ought to be production oriented. The only mention of "project control standards" (including documentation and progress reporting) is a suggestion, towards the end of the book, that standards ought to be used. The absence of discussion of these standards is an omission which the author has probably covered in her other book, *Project Management in Data Processing*.

The book does not impose standards, but indicates where standards are needed. Unfortunately it mentions some areas where standards are needed without discussing guidelines for developing them.

Miss Woodbridge has devised 10 basic chart symbols for analysing work flow, "which analysts can add to as the occasion arises." The flowchart which illustrates the use of her symbols contains a major error which might not have occurred if she had used the five conventional symbols for work study diagrams.

An omission is the document flow cross-reference chart, which reduces a three-dimensional problem to a two-dimensional analysis. As a result of these faults, the section on data and problem analysis is the weakest in an otherwise excellent book.

The book suggests that job descriptions might be included as appendices to standards manuals, without discussing the standards required for them or the related topics of "terms of reference" and "department structures." Treatment in greater depth would also have been desirable in the sections on use of glossaries; user department system tests (which appear undervalued); checking standards are compiled.

A standards manual should not be allowed to become a textbook. For training staff a separate text with examples and exercises should be available. This is underemphasised.

The remainder of the book, devoted to standards for development and implementation of systems and programs, provides excellent coverage of installation requirements. The book is an essential reference work for managers and consultants concerned with the introduction of standards.

J. W. MITCHELL

## Browser's pleasure

The compleat computer, edited by D. Van Tassel. 214pp, plus index. £3.55. Science Research Associates, Chicago.

THE full title continues, "being a compendium of Tales of the Marvellous, poetry, informative news items, articles for education and enjoyment, cartoons plus many other illustrations — with a splendidly section of science fiction art in full colour." Perhaps this is not a book to read, but rather one to own and browse through for sheer pleasure.

It comprises about 100 reprints, sometimes somewhat curtailed reprints, of articles ranging from the history of computing, applications, governmental usage (including key areas of privacy and security), software and so on right through to some fairly sensible predictions for the future, including the sociological implications.

It manages to do this entertainingly both for the computer practitioner and the non-computer specialist. Indeed the editor has largely succeeded in showing how non-computer specialists think about computers. This is achieved by an excellent selection of science fiction articles, cartoons, advertisements and even poetry ranging from Auden's disquieting *The Unknown Citizen* right down to the.

STEVE SHIRLEY

## Program design for software specialists

Program design methods — working papers, by G. B. Blazquez. 104pp. £2.50. National Computing Centre.

THE short collection of working papers contained in this volume is intended primarily for NCC members, and in particular for management and senior personnel in commercial programming. The final sections are devoted to a description of some of the new types of documentation techniques which are currently in use, the application of special purpose

P. G. BARKER

## Comprehensive work on Cobol

Advanced ANS Cobol with structured programming, by Gary D. Brown. 512pp. £13.50. Wiley-Interscience.

AS the title suggests, the author has packed a lot of information into this book. It includes a comprehensive description of ANS 74 Cobol, good programming practice in Cobol, IBM 370 OS Cobol and how to use it.

The book is not really intended for beginners, but does describe all the features of ANS Cobol from MOVE and ADD all the way through to the Report Writer and the Communications facility.

The text has a broad coverage, and a large number of concepts and techniques are reviewed. Most of the topics are not taken to a detailed level, as the reader is able to investigate further the details of particular topics via the extensive bibliography (87 references). This collection of references contains pointers to the most important primary sources of information in this area; for example, the work of Dijkstra, Mills, Wirth, Parnas, Jackson and many others.

Essentially, the material contained in the book is sub-divided into 13 main chapters. The first five

J. M. TRIANCE

program design languages and their possible use in conjunction with computer-based design systems.

The book is well-written

and has a pleasant, easily digestible style. Even the half dozen printing errors that it contains do not significantly reduce the standard of presentation.

To reiterate my opening remarks, the text should be made recommended reading for all established and trainee software engineers.

JOHN W. MITCHELL

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in binary, decimal, BCD, octal and hexadecimal. The basic theorems of Boolean algebra are given, and the principles of gating lead on to the design of more complex arrangements. Flip-flops, transfers, clocks and their functions, shift registers, binary counters and integrated circuits are covered under the heading of logical design. Digital circuits are discussed, and the functions of semiconductors, AND and OR gates, Schottky diodes, MOS and CMOS circuitry are explained.

THIS book lives up to its title; the operation and design of computers are thoroughly covered, and any necessary theory is given. Its main appeal will be to the student, for whom many examples and some selected answers are provided. Subjects are covered at a level which should ensure that the computer science or data processing degree student has all the information he needs. However, the systems analyst or programmer in the field will find a great deal of interest here, but little that is vital.

Number systems are covered in detail, with conversions and representation

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## SPECIALIST COMPUTER RECRUITMENT LTD.

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Freepost, Equity and Law House, 35-37 Great Charles Street, Queensway, Birmingham B32 8BR

**MANCHESTER** 061-833 0676 FREEPOST

Freepost, Corn Exchange Buildings, Corporation Street, Manchester M4 8BD

**LONDON** 01-935 0671 FREEPOST 6

Freepost 6, 102, Blandford Street, London W1E 1JZ

**CSA** Computing Services Association

**JBA**

## Technical Author

**Berkshire** c. £6000

An international consultancy have a vacancy for an experienced applications software author. The successful appointee will enter a team environment, will be a self-starting, flexible individual with the ability to write clear and concise procedural descriptions. Senior programmers or analysts who can demonstrate a background of self-documented work will be considered.

Excellent fringe benefits are offered.

Contact: Mike Creamer

## Technical Authors & Engineers

**Home Counties/South** up to £5500

A number of our clients are urgently seeking experienced authors (in some cases graduate trainee authors) to carry out documentation work on a variety of technical computer based systems, or commercial systems (with hardware or software bias). Experienced Computer Engineers, in field support or instructional areas are also sought.

Excellent staff benefits and prospects.

Contact: Mike Creamer

## COBOL/PLAN Programmers

**Middlesex** up to £4500

A large international manufacturing company are seeking COBOL and/or PLAN programmers with at least 1 year's experience in d.p. and be competent in FORTRAN using RSX11. A commercial or communications background would be preferred. This is an exciting opportunity to join a large well-known company.

Salaries negotiable. Excellent fringe benefits.

Contact: Mike Creamer

For further information on any of the above vacancies please contact the appropriate consultant. If your qualifications do not

match the above positions but you are seeking other opportunities please contact us anyway.

## Instructor

**Herts.**

Our client, a progressive and expanding mini computer manufacturer, requires an instructor to provide training courses in the application of computers to business systems. The successful individual will have considerable experience of business orientated applications including the development of accountancy systems. Additional knowledge in the stock/production control areas would be an advantage. Previous instructing experience is obviously desirable but candidates with the potential, enthusiasm and flexibility of approach to training will be considered. Excellent opportunity for career advancement.

Contact: Margaret Stevens

Neg. c. £6000

Our client, a progressive and expanding mini computer manufacturer, requires an instructor to provide training courses in the application of computers to business systems. The successful individual will have considerable experience of business orientated applications including the development of accountancy systems. Additional knowledge in the stock/production control areas would be an advantage. Previous instructing experience is obviously desirable but candidates with the potential, enthusiasm and flexibility of approach to training will be considered.

Excellent opportunity for career advancement.

Contact: Margaret Stevens

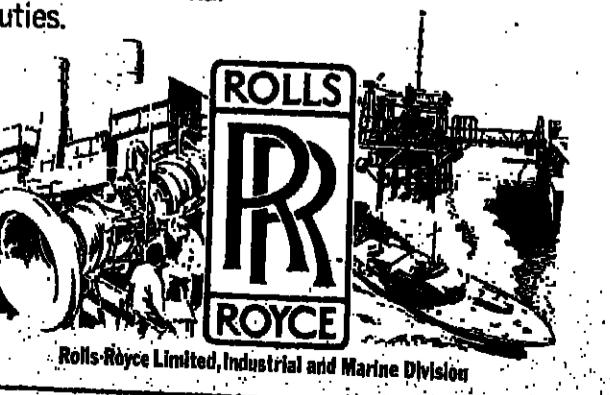
## FORTRAN/RSX11 Programmer

c. £5000

Our client, an international organisation, has a vacancy for a software specialist to work on new systems in the commercial area. Applicants must have several years experience in d.p. and be competent in FORTRAN using RSX11. A commercial or communications background would be preferred. This is an exciting opportunity to join a large well-known company.

Salaries negotiable. Excellent fringe benefits.

Contact: Margaret Stevens



**CAPITAL APPTS.**  
**LECTURERS**  
Vacancies in all areas for technical and commercial lecturing.  
**SALARIES** to £6,500.  
537 5551/day, 493 0966/eve.

**X-Calibur**  
COMPUTER SERVICES

S&P Consultants or Project Leaders

This Sunday dial your future on 01-402 9355



Marcel are currently into an expansion phase which will see the Marcel Group become one of the major computer service companies in the UK and Europe. Our current development areas include extensive 2900 practical experience, international message switching, design, and advanced systems in the aerospace and petrochemical industries.

In order to sustain this growth, we need a number of senior people with solid experience of programming and/or systems with a background of IBM, ICL, Honeywell, Burroughs, Univac.

Salaries are high and future rewards will be based on performance.

Please phone this Sunday or come round to the office between 10a.m. and 4p.m. and find out what the future is with Marcel, Marcel Computer Services Ltd., 60 Queen's Gardens, London, W2.

An associate of The Norwich Union Group.



**QUEEN MARY COLLEGE**  
University of London

**COMPUTER CENTRE USER DOCUMENTATION**

Applications are invited from graduates with computer experience and the ability to analyse and completely understand the user documentation produced will be for the services developed on this new computer.

Salary in range £2804-£2811 per annum, plus £450 London Allowance. Applications should write giving full details (including two referees) to The Registrar (CW), Queen Mary College, Mile End Road, London E1 4NS.

437 5551 day 445 048111

**Real-Time Mini Computer Programmers and Team Leaders**  
EMI Medical Limited, Brain Scanner Division, Radlett, Herts.

We require innovative programmers to design, develop and support software for the EMI Brain Scanner. The Scanner is a unique blend of electronic and mechanical engineering, physics and software. We now wish to expand our small interdisciplinary development team.

The challenge to produce programmes for new and existing systems calls for mechanical, peripheral handling and user interface expertise.

Your background should be in computer programming, principally in real-time applications with mini computers or microprocessors. It would be useful to have had some experience of working closely with electronic engineers during the development of a system.

You should have a degree or equivalent in computer science or in science or engineering subjects. You should have programmed extensively at low level, but a knowledge of high level languages would be useful.

**PROGRAMMER**  
Positions carry salaries of up to £5,000 per annum, according to experience. Candidates should have a minimum of two years' experience.

**TEAM LEADERS**  
You would command a salary of up to £5,500 per annum, and we are looking for at least four years' experience.

Conditions of employment are excellent, as you would expect from a new division of a large international company, we offer four weeks' holiday, a subsidised canteen, sickness and pension schemes and staff discounts on many products. We would consider the payment of relocation expenses where appropriate.

To apply, please telephone or write to Richard Morley, EMI Medical Ltd., Brain Scanner Division, Colney Street, St. Albans, Herts. AL2 2ER, Telephone Radlett 4722.

**EMI** EMI Medical Ltd.  
The International music, electronics and leisure Group.

# CONTRACT

U.K.

Up to £250 per week in a variety of locations for

**SYSTEMS ANALYSTS**  
**ANALYST/PROGS** —

**IBM COBOL**

**SYSTEM 4 COBOL**

**BURROUGHS 3700/6700**

**COBOL**

**ASSEMBLER CICS**

**PLI**

**HONEYWELL 6000 —**

**IDS/TDS COBOL**

**IMS SYSTEMS DESIGNER**

**1900 COBOL/PLAN**

**RPG II**

U.S.A.

Up to £250 per week in a variety of locations for

**ANALYST/PROGRAMMER**  
(with basic IBM programming)

**IMS & CICS useful**

**PROGRAMMERS:—**

**IBM COBOL**

**PLI**

**BAL**

**IMS D.B.**

**CICS**

**PDP RSTS**

Up to £250 per week in a variety of locations for

**1900 Minor Atlanta, Texas and California**

For further information ring

Christina Carr or Ann Collins on 01-437 2062 3/4

**D.P. SUPPORT SERVICES LIMITED**

Kent House, 87 Regent Street, London W1 —

## HERTS., BEDS. & BUCKS.

**REAL-TIME SYSTEMS DESIGNER** £7000

To lead project team in new software development

company. Real-time exp. essential.

**OPERATORS** £4000

IBM OS/MFT or OS/VS operating experience required for large progressive installation.

**PROGRAMMERS** £5500

New Commercial application development for well established Mini manufacturer. COBOL and/or Assembler experienced required.

**SYSTEMS PROGRAMMERS** £5500

PLI and Assembler background necessary with knowledge of SHADOW and DBOMP an advantage.

Contact: Roy Brackenbury, St Albans Ltd.

**Blue ARROW** (recruitment)

Blue Arrow House, 3 Holywell Hill, St Albans, Herts.

**Worcestershire to £6K**

To be responsible and promote a number of computer systems in Worcestershire and the surrounding counties. require Programmers and Systems analysts. Experience

Required: 2 years' experience are for

IBM PL/I and Burroughs software programmers, COBOL programmers and Analysts with experience.

Salaries are very competitive and relocation for

Relocation, relocation and relocation for

## ET DEI IPSI EIS QUI OCCASIONI DESINT AUXILIUM FERRE NON POSSUNT

We are the newly-formed information processing subsidiary of a large multi-national group. One of our objectives is to become the leading European supplier of microprocessor based small business systems. We have immediate vacancies for several top specialists, men or women who, by their contribution, will justify substantial rewards both materially and in job satisfaction.

We expect candidates to be of degree standard though they may not have a certificate to prove it. Analytical ability, tenacity, initiative and a capacity for attention to detail are essential; a strong sense of humour will help. We expect our staff to be adaptable, to work well with others and to be prepared to work unsupervised; those who deliver the goods will progress rapidly as the organisation develops. Basic salaries of up to £8000 plus car and the usual fringe benefits are offered. Additional payment will be made based on the profitability of individual projects. Location is London; some European travel may be necessary.

This is an opportunity to get in at the start of an exciting new venture — if you enjoy a challenge (or if you would like a translation) drop me a line.

TED DAVISON  
BUNZL DATA SYSTEMS LTD.  
TELETYPE OFFICE  
21/24 CHISWELL STREET  
LONDON, EC1 4UD

### MICROPROCESSOR ENGINEERS

Prime tasks:  
1) Test, install and commission microprocessor based commercial systems  
2) Develop new hardware to improve performance of these systems

*Essential*  
Detailed knowledge of LSI/11 based hardware systems — especially with cartridge and floppy discs. Organising ability and man-management skills.

*Preferred*  
Experience of networking LSI/11s and PDP 11s both locally and via Data Communications. Knowledge of PDP 11 Assembler and operating systems — especially RSTS and RT11.

*Remarks*  
A training visit to the USA will be an early requirement.

### SOFTWARE PROJECT LEADERS

Prime tasks:  
To carry out major software projects for turnkey systems using LSI/11 microprocessors

*Attributes*  
At least three years' experience of commercial software applications (preferably with DEC hardware). A proven record of meeting agreed deadlines.

*Preferred*  
Experience of PDP 11 Assembler, RSTS and RT11 operating systems and real time programming

## Super Benefits CAMBRIDGESHIRE SYSTEMS ENGINEERS Salaries to £5,500 p.a. (1900 PLAN & 370 ASSEMBLER backgrounds)

Our Client is a small, professional concern which is a market leader in its specific area of packed system sales, development and installation. It is soon to extend this pre-eminence into a fresh and exciting associated application area, and these positions are open at the start of this new venture.

Specifically you should have:

- ★ good PLAN and/or ASSEMBLER experience
- ★ sound 1900 or 370 based experience
- ★ the ability to work closely with clients and to act as professional, technical ambassador of the company
- ★ a preparedness to travel within the UK

CONTACT: REG HEATH on  
021-236 3781

REF. 77/08/6

### BRING YOUR ICL SYSTEM 10 EXPERIENCE TO DEVON

WDP is a well established Bureau and Software House currently expanding its services to cover the ICL System 10 range of computers.

We require an experienced Programmer or Analyst/Programmer to fill an important and responsible role on System 10 Software Contracts.

Applicants must be able to show their competence in ASSEMBLER and have a good working knowledge of the basic software. Experience in program design/specification and/or applications software would be an advantage.

The successful applicant will be offered a salary according to experience; assistance with removal expenses will be given.

Please contact:  
Western Data Processing Ltd,  
7/8 Colleton Crescent  
Exeter, Devon EX2 4DG  
Tel: Exeter (0392) 34131

### UNIVERSITY OF CAMBRIDGE COMPUTING SERVICE

The University Computing Service has vacancies for two computer Officers.

**SYSTEMS PROGRAMMER**  
to be involved with the maintenance and development of operating systems software for the University's IBM 370/186 computer and associated communications and other equipment.

**USER SERVICES PROGRAMMER**  
to handle the day to day aspects of operation with a large user community both in Cambridge and from many other Universities. Applicants should have a degree in computing, qualification in a computing discipline, a university environment would be an advantage. Appointment will be to Computer Officer Grade II or Grade IV on salary scales £3,647 and £4,611 (plus USU benefits) according to age and experience.

The post is part-time, these scales apply including increments of age, qualifications and relevant experience. The names of two referees should be given to the University Computing Service, Computer Laboratory, Corn Exchange Street, Cambridge, CB2 3DG to reach him by not later than 31 August 1977.

### SPECIALIST COMPUTER RECRUITMENT LTD. BIRMINGHAM 021-236 3781 FREEPOST

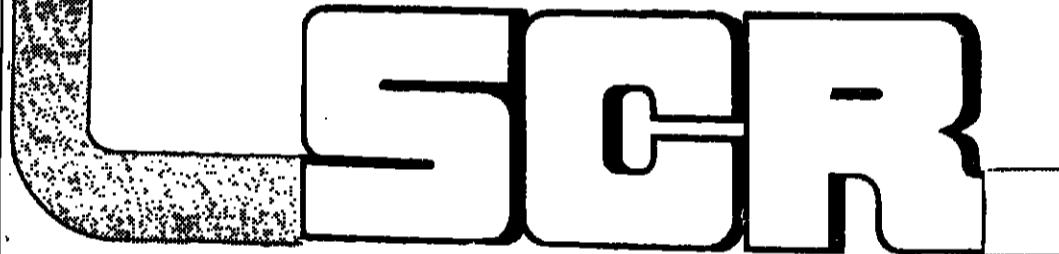
Freepost, Equity and Law House, 35-37 Great Charles Street, Queensway, Birmingham B3 2BR

### MANCHESTER 061-833 0676 FREEPOST

Freepost, Corn Exchange Buildings, Corporation Street, Manchester M4 8BD

### LONDON 01-935 0671 FREEPOST 6

Computing Services Association



## Duncan Bransom Recruitment SENIOR SYSTEMS CONSULTANT - £8.500

### The Company

The Company is HERTZ, the world leaders in the car rental business. Their European Headquarters is at Isleworth, Middlesex, which is also the base for their Management Systems and Services Department. Operating in the dynamic car rental business, the company requires information systems that can respond quickly to new situations.

### The Job

The job involves designing and writing innovative computer systems to operate on an I.B.M. mainframe using non-I.B.M. minis for front end processing.

In the dynamic car rental business the market place is constantly changing and with the requirements for management information. Thus basic systems of an accounting nature have to be developed as well as the information systems that use them as a source of data.

Such systems need to be applicable to all countries in Europe, thus some travelling to the continent can be expected amounting to about two or three days per month.

Please write or telephone for an application form to:  
Roger Griffiths, Duncan Bransom Ltd.,  
37, Hillcrest Road, Loughton, Essex  
Telephone 01-508 6121

Duncan Bransom Limited

### You

You have had at least five years' experience in designing and installing systems — most of it in an I.B.M. mainframe environment where the installation language was Cobol, probably under OS.

Already you have proved your ability in managing staff either as a project leader, systems manager or data processing manager.

Now you are looking for a job where the pace is a hot one, where decisions are made quickly instead of through interminable committee meetings, and where you can be involved not only at the feasibility stage but right through to start-up and implementation.

# MANAGEMENT & EXECUTIVE SELECTION

telephone 01-637 9611

## PROGS, ANALS

### ESSEX

to £5K

All levels of staff from trainee to senior analyst are required by our client, a multi-national company. They are currently installing an IBM System 3 and are designing and implementing production and financial systems. Initially the processing will be in batch mode; on-line systems are planned in the near future. RPG II experience is essential. Full training will be given to novice programmers and to those wishing to become analysts. Benefits include full relocation expenses, a yearly bonus scheme and the opportunity of joining a company where promotional prospects are both varied and excellent.

Contact Pam Quinlan.

## SUPPORT MNGR c£6K LONDON

A well established international computer manufacturer requires a capable executive to manage all technical support for pre-sales activities and the implementation of customer systems using standard products. He/she must have a thorough knowledge of disc-based DP systems; experience of the complete implementation of computer systems through Sales Project or MIS involvement; one year's programming in a high-level language (pref. COBOL); and previous supervisory or management experience. Sales Support/DP Management/Snr Systems Analysis backgrounds will be most appropriate.

Contact Peter Gorton.

Suite 201/6 Albany House 324 Regent Street London W1R 5AA 01-637 9611

## SUPPORT ANAL c £6K CENTRAL LONDON

A responsible and self-motivated person is required by our client to co-ordinate the systems and programming support required by their users. Liaison with both manufacturer and software house will be necessary to ensure this. You will also be responsible for the analysis of new system requirements, thus the ability to establish a close working relationship with users is a must. Commercial experience gained on mini computers is essential; a knowledge of O & M or accounting would be helpful. Priority will be given to those candidates with real time systems experience gained on DEC equipment.

Contact Pam Quinlan.

## SALES Total Earnings £12K LONDON BASED

A major computer manufacturer is in the process of setting up a new division which will deal exclusively with the large manufacturing corporations. They require a mature sales person, with experience in this industry, who is capable of negotiating large contracts, at board level, and who also has the initiative to develop this new business venture. This position offers an ideal opportunity to be a member of a small team and to be in the right place when the future management structure is developed.

Contact Faye Ogilvie.

## MANAGEMENT & EXECUTIVE SELECTION

Due to winning a number of prestigious contracts both in the UK and Europe, we are now looking for professionals of the computing world with skills in the following areas:

DEC PEOPLE	Both at home and abroad we need staff with RSTS and BASIC PLUS experience.
EUROPE & IN-HOUSE	Data General Programmers and Analysts with one to five years' experience. Knowledge of BASIC or COBOL or Assembler.
IBM TEAMS	To supplement our IBM teams we need staff who have worked on System 3 machines; or used IMS or RTAM packages; or have experience of operating IBM Operating Systems.
CORAL EXPERTISE	Programmers with a minimum of two years' experience. MEDICAL FIELD or ARGUS 700 knowledge an asset.
TECHNICAL AUTHOR	We are looking for an adaptable technical author to work on a wide variety of projects who has the ability to write both user and operating manuals.

If you meet these demands and you want to expand your career apply to Dawn Jeans, Personnel Officer, Leasco Software Limited, 150, Bath Road, Maidenhead. Telephone Maidenhead 23391.

Facilities and benefits offered include free recreational activities, car parking, lunches, modern offices, sickness and life benefits, part-contributory pension scheme. Generous allowances while working overseas.

Salaries negotiable in the range £3,500 - £9,000.



## JOIN THE PROFESSIONALS OF THE COMPUTING WORLD

Leasco

## IBM System/3

London West Central

### SENIOR ANALYST/ PROGRAMMER to £6,250 p.a. RPG II PROGRAMMER to £3800

THE COMPANY: A well-established and profitable international organisation, who offer secure employment. RESPONSIBILITIES AND REQUIRED BACKGROUND

The Senior Analyst/Programmer will handle all aspects of the development and implementation of systems, including programming. Some supervision of staff will also be involved.

Suitable candidates are likely to have at least 5 years' DP experience, some gained within an IBM environment. Competence in RPG or COBOL is also required.

Above all, applicants should be articulate, self-starting and have a professional approach to their work.

The Programmer will undertake programming work but will also become involved in applications systems.

Previous experience of programming is required, ideally on IBM EQUIPMENT.

Also required is the ability to understand and maintain complex systems. Age possibly early 20's.

PLEASE TELEPHONE WITHOUT DELAY or if you prefer, send a personal summary.

**DPS**  
Crown House, Morden, London SM4 5EU  
recruitment division  
01-540 8311  
24-hour answering service

**BECOME A  
TECHNICAL JOURNALIST  
ON**  
**COMPUTER WEEKLY**

We are looking for writers to join the successful and experienced team on Computer Weekly.

Essential qualities are proven computer experience or a qualification in computer-related studies, plus the ability to write quickly, accurately and clearly to meet strict deadlines.

People with operations experience and/or an in-depth software background will be given priority for the current vacancies. However, if your experience falls outside these areas, and you are interested in joining the team, why not contact us?

Writing for Computer Weekly is a job that opens up interesting new career possibilities for DP people. If you think you can meet our standards contact Malcolm Peltu, Editor, Computer Weekly, Dorset House, Stamford Street, London SE1 9LU, giving brief biographical details.

### Sales Demonstrator

We are looking for someone to demonstrate Sperry Univac data processing and terminal equipment in the South of England. You would be prepared to travel away from home frequently and a valid driving licence is essential. You must be able to communicate with people as well as the ability to train customer operators.

We offer a generous salary, plus car allowance and the normal large company benefits.

Write or telephone (you may reverse the charges) Nigel Harris at Sperry Univac, 88 Holborn Viaduct, London EC1P 7AB.

Telephone 01-228 1010 and arrange for an interview.

**SPERRY UNIVAC**

COMPUTER SYSTEMS

### CAPITAL APPLIED

**FORTRAN**  
Programmer required for industrial and scientific applications.  
£3,850-£6,000  
Phone for free leaflet of vacancies.

1000

### IMPERIAL COLLEGE

**POSTDOCTORAL  
RESEARCH  
ASSISTANT**

Required with experience in COMPUTER PROGRAMMING to work with Dr. H. R. Morris on an SRC Research Grant (1 year). The research will involve the development of new computer programs for the automatic structure elucidation of biological molecules using a new COMPUTER MASS SPECTROMETER installation.

Salary up to £4234 incl. London Allowance, + USB.

Applications including curriculum vitae and the names of two referees, should be sent to: Dr. H. R. Morris, Biochemistry Dept., Imperial College, London, SW7, as soon as possible.

Application form and further details may be obtained from the Personnel Officer, Greater Glasgow Health Board, 68-112 Knightsbridge, London, SW1X 7LR.

## We have been retained by our client, a ten year old service bureau to recruit THREE PROGRAMMERS CENTRAL LONDON

c £5,000

Our client, who is presently embarking on a new software house venture which heavily involves the use of MINI computers, requires candidates with a thorough working knowledge of COBOL together with a good understanding of an Assembler language. It is envisaged that candidates have a minimum of two years' programming experience and the ability for creative thinking. Although only a small company (less than thirty people) our client has satisfied a large number of demanding clients for nearly ten years and therefore the opportunity to grow from within as the company continues its expansion, is excellent.

*Our client would also arrange both in-house and manufacturers courses in Assembler or other according to candidates' background.*

For more details and to arrange an informal interview please contact STUART WINFIELD on 01-439 9817/8 or (01-439 3933, 24 hours).

**RECRUITMENT  
RESOURCES  
LIMITED**

2 Gt. Marlborough Street  
London W1V 1DG  
01-439 9817/8

**G**  
PLAN

### PL/1 PROGRAMMER

The makers of G-Plan furniture are seeking a programmer with at least 18 months' PL/1 experience, to join a small team.

The installation is a 370/125 operating under DOS/VS with POWER and we are currently implementing a trial T.P. Order Entry system under SHADOW/II.

The successful applicant will be expected to show considerable initiative and work with minimum supervision.

Conditions of Service and Salaries are very good.

Apply, stating details of experience, to:  
Company Personnel Manager  
E. GOMME LIMITED  
P.O. Box 27  
High Wycombe, Bucks.

BENEFITS INCLUDE INTERESTING WORK  
FOR A GOOD COMPANY IN NORTH LONDON

### Systems Software Programmer

We would like to hear from Software specialists with experience of a large minicomputer or two CHIEF OPERATORS or SHIFT LEADERS with Honeywell 6000 or Level 66 who would like to be trained into the software area of maintenance and support.

### Analyst/Programmer

For the development and maintenance of engineering systems on a Honeywell operating time sharing and remote job-entry terminals. Typical applications are logic simulation, test generation and analog circuit analysis involving interfaces with graphic systems. Applicants will need about one year's experience of FORTRAN or another mathematical language.

Telephone Mike Batsch, 01-235 7030, Ext. 218

**PER** PROFESSIONAL  
and EXECUTIVE  
RECRUITMENT

This vacancy is open to male and female applicants

## Programmer/Analyst for large mini-computer: Marketing oriented applications.

Three factors pick out this job from the other ads: the machine, the environment and the programs. You will be working on a PDP 11/40 using RSTS, with 198K bytes (Basic Plus language) - so, by mini-computer standards, decidedly not so mini.

The small department of programmer/analysts and terminal operators serve in-house clients who are essentially marketing people and who (enough on its own to make the job attractive) understand the computer and don't need educating in its use.

Most interestingly, though, the applications vary immensely from the usual payroll and ledgers. The computer is used for marketing analysis, sales forecasting and product costs: there are new applications to be developed, but they too will be marketing oriented. Our candidate specification is wide: we need another team member and we'll pick the person to suit our style - young, practical and lively - whether he or she is basically a programmer, or has systems experience.

For this reason, the salary is variable too - but, whatever you are earning, if you are right for us the combination of job interest, super Knightsbridge offices and good salary will make sure you feel we are right for you.

Please write with full career details to: Jacqui Thomas, Recruitment & Training Officer, Avon Overseas Limited, Bowater House, 68-112 Knightsbridge, London, SW1X 7LR.

**AVON**



**PROGRAMMERS, SENIOR PROGRAMMERS  
ANALYST/PROGRAMMERS, SYSTEMS ANALYSTS**

IBM 360/370  
ICL 1900, 2900, SYSTEM 4  
UNIVAC 1100, 9030  
HONEYWELL 2000  
NCR CENTURY

COME AND TALK TO  
OUR MANAGEMENT AND STAFF ABOUT YOUR FUTURE  
AND OUR PRESENT AND FUTURE

at

**THE GREAT EASTERN HOTEL  
LIVERPOOL STREET, E.C.2**

(just by Liverpool St. Station)

ON EITHER

Monday or Tuesday, the 22nd or 23rd of August

anytime from

12.00 noon to 9.00 p.m.

PROJECTS THROUGHOUT UK,  
BUT PRINCIPALLY IN LONDON  
AND THE HOME COUNTIES. WE  
ALSO HAVE A NUMBER OF MEDIUM  
AND LONG-TERM PROJECTS,  
STARTING SOON, IN THE MIDDLE  
EAST AND EUROPE

**MOUNCEY AND PARTNERS LIMITED**

**YORK HOUSE, EMPIRE WAY, WEMBLEY, MIDDLESEX. Telephone Number: 01-903 4901**

**Group Offices in Knightsbridge, Manchester, USA, Germany, France, Holland, Switzerland, Sweden and South America**

**SEDGWICK FORBES GROUP**

*International Insurance Brokers*



## MAJOR OPPORTUNITIES AT ALL LEVELS WITH ONE OF BRITAIN'S LARGEST INSURANCE BROKING GROUPS

**I.B.M. 370/145 x 3  
OS - VS/1  
Database  
Distributed Intelligence  
Network of 125+ terminals**

Based in Witham, Essex  
Superb new offices  
Excellent working conditions  
Subsidised restaurant  
Active sports and social club

## OUR EXPANDING ORGANISATION

Our successful program of development is continuing to extend and integrate the U.K. broking systems using both database and distributed intelligence techniques.

In addition we are now expanding the system services organisation to provide data processing support for overseas members of the Sedgwick Forbes Group.

This has created a number of opportunities for experienced systems staff in both the development and production departments.

If you enjoy a stimulating and demanding environment come and talk to us.

Applications in the first instance to  
Mrs J. Smith, Personnel Officer, Sedgwick Forbes Group, Grove House, Newland Street, Witham, Tel: Colchester 69191

# Computer Specialists for on-going projects and new systems development.

There's probably more computer experience to be gained on Zambia's Copperbelt than you ever imagined.

At their Central Services Division, the two major mining companies - Nchanga Consolidated Copper Mines Limited and Roan Consolidated Mines Limited - operate a wide range of computer based information and control systems, and are among world leaders in developing computer applications to the requirements of their industry. Production capacity on Zambia's Copperbelt is some 700,000 tonnes of refined copper a year.

Applications are invited from experienced Systems Analysts and Programmers

with at least 2 years' experience on IBM equipment using PL/I, to join (on a 2 year renewable contract) small teams engaged in new systems development and improving existing technical and commercial systems.

Equipment at each of the two Divisions - one at Ndola, the other at Kitwe - includes a two megabyte IBM 370/168 installation with extensive peripheral equipment.

**£5,500-£7,000 a year  
plus at least £3,000 tax free when you get back**

Please send me further details and an application form

NAME:  A.D.E.  
ADDRESS:

Position applied for  
Experience:

To: The Manager, Zambia Appointments Division,  
Zimco House, 128-139 Finsbury Pavement, London EC2A 1NA

## A great life

Salary: At least £5,500 p.a. at current exchange rates depending on experience and level of responsibility, and there's a tax free gratuity of 25% of salary, payable annually in the UK or country of recruitment.

Living conditions too are well above what you would normally expect in a developing country: good houses and flats - most of them with gardens; domestic help; supermarket shopping where, despite local shortages, most things you are used to are easy to get; excellent kindergartens and schools for young children.

Applications are invited from experienced Systems Analysts and Programmers

with at least 2 years' experience on IBM equipment using PL/I, to join (on a 2 year renewable contract) small teams engaged in new systems development and improving existing technical and commercial systems.

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Please send me further details and an application form

NAME:  A.D.E.  
ADDRESS:

Position applied for  
Experience:

To: The Manager, Zambia Appointments Division,  
Zimco House, 128-139 Finsbury Pavement, London EC2A 1NA

CW48

**RCM  
NCCM**

## SENIOR SYSTEMS ANALYST & PROGRAMMERS

Due to internal promotion we have a vacancy for an experienced Senior Systems Analyst.

The successful applicant will have at least 3 years experience in Systems Analysis and will be thoroughly familiar with all aspects including the implementation of package programs. Experience of working with computer based engineering production control systems would be added advantage.

We also have vacancies for experienced Programmers. Applicants should have at least 2 years' Programming experience preferably in Cobol. Knowledge or experience of on-line techniques would also be an advantage.

Applicants should write stating their age, experience and current salary to: Mr. A. Cockram, Personnel and Training Manager, Armitage Ware Limited, Armitage, Nr. Rugeley, Staffs.

**armitage shanks** A Armitage Ware Limited Armitage, Rugeley, Staffs. WS18 4BT

**CITY - IBM OPERATOR** £3300  
An experienced IBM operator with a minimum of 2 years' DOS VS experience to work in a banking environment. The successful applicant, who should be mature and intelligent, will be required to work a 24-hour system. Generous fringe benefits include subsidised mortgage, annual bonus and Lyf.

**CITY - IBM SENIOR OPERATOR** £3400  
Our client, a large financial organisation, require an operator with approximately 3 years' OS VS1 experience. A high level of technical expertise is essential for this position, which offers excellent career advancement. In addition to the attractive salary, benefits include subsidised mortgage and annual bonus.

**CITY - ICL SHIFT LEADER** £4000  
A minimum of 3 years' operating experience, ideally GEORGE II, is required to join a large industrial concern. A two-shift system is in operation and it is envisaged that the successful applicant will transfer to New Range 2500 hardware after a short period. Usual large company benefits apply including subsidised mortgage and Lyf.

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Applications are invited from operators with approximately 12 months GEORGE II experience to join the large industrial concern. A locally convenient shift system is in operation comprising primarily of DAY SHIFTS.

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(Ref: S3508/CW)

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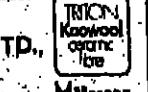
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COUNTY TREASURER'S  
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Grade S01/2 £4239-£4992 plus £520 supplements

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Responsibilities will include operating system support, maintaining communications support plus Datascene experience, together with involvement with the Systems/Programming Development Teams

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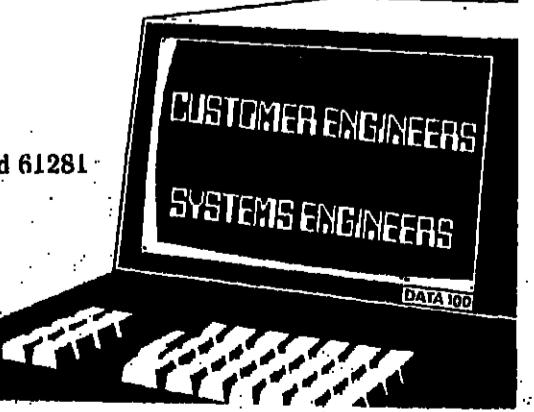
London Central, Manchester,  
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If you feel you have the experience that would contribute to our success, please apply to Mr. T. Hubber at the address below.

Personnel Department,  
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Hemel Hempstead, Herts,  
Telephone Hemel Hempstead 61281

**DATA 100**



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to £6,000

Development career progression, financial or simply fed up with commuting. These are a few of the reasons why you may want to consider working in a more local environment. At the moment we have at least a dozen requirements throughout Hertfordshire for SYSTEMS ANALYSTS with about 2 YEARS' good commercial or financial experience. Our clients list is a seemingly repeatable involving many installations and these already committed to expansion. We feel sure we must have a vacancy to suit your needs.

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Salary: £2,922-£4,098  
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Current vacancies exist in the following locations:

London Central, Manchester,  
Birmingham, Sheffield

The Company offers competitive salaries which are negotiable and commensurate with experience. A Company car is provided together with fringe benefits, including relocation assistance, where necessary.

If you feel you have the experience that would contribute to our success, please apply to Mr. T. Hubber at the address below.

Address: CMA, 87 Regent Street, London W1R 7HF

Telephone: 01-437 2062/3/4 (24-HOUR ANSAPHONE)

# Programmers to £4,900

A number of programmers are required to be responsible to a Project Leader or Systems Analyst for the efficient and accurate production of computer programmes to specification for the Authority's ICL 1903T and for the replacement ICL 2960.

Applications are invited from candidates with:

A degree or professional equivalent or good 'A' levels.

Two years' experience of systems analysis, including successful implementation of projects, and/or

Three years' experience of programming, in COBOL, at a senior level.

It would be an advantage to be familiar with ICL 1900/2000 series.

Salaries will be negotiated within a scale from £5,171 - £6,023, according to qualifications and experience.

Application form, to be returned by 2nd September, 1977, can be obtained with further particulars from the Personnel Officer.

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Re-advertisement — previous applicants will be considered without further submission.

Details from: The Services Officer (C.24)

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Leeds LS1 3HE

0532 41101

Please enclose s.a.s.

Closing date: 2 September 1977

For an application form please write or telephone:  
A Bennett, Civil Aviation Authority,  
Personnel Branch 2, Aviation House,  
129 Kingsway, London WC2B 8NN.  
Tel: 01-405 6922 Ext 509.

Applications must be returned not later than 6 September 1977.

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## PRODUCT NOTES

### UK launch for Styrofill loose-fill packing material

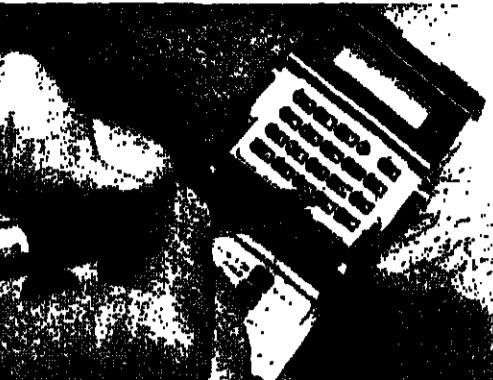
SPICER-COWAN is to manufacture under licence and distribute in the UK the Styrofill expanded polystyrene loose-fill packaging material developed by BASF in West Germany.

The saddle-shaped chips will be available in 15 cubic feet polythene sacks that can be adapted into hopper mode.

It added that Styrofill was chemically inert and resistant to most common materials and many corrosive chemicals; but would be attacked by some strong oxidising agents.

It did, however, become progressively softer at temperatures approaching 100°C.

Under the loads likely to be imposed during transport, the manufacturer advised, that



Styrofill could be used at temperatures of up to 85°C.

Spicer-Cowan pointed out that since the cell walls of Styrofill — about 2% of the total volume — consisted of amorphous thermo-plastic, the material was not sensitive to low temperatures.

It did, however, become progressively softer at temperatures approaching 100°C.

However, it was combustible when placed in contact with calcareous materials such as wood, wool, paper or cardboard; but the rate of spread of flame was considerably less than other packing materials.

Styrofill will not melt, disintegrate, hydrolyse, or rot when brought into contact with moisture and is not hygroscopic.

It can be recycled either as a cushioning material or shredded to lighten horticultural earth and for field drainage. It can be incinerated in a proper incinerator operating at 800 to 1,000°C with no harmful products released, Spicer-Cowan added.

Spicer-Cowan Ltd (C.W.), New Hythe Lane, Aylesford, Maidstone, ME20 7PB. Tel: 0622 77777.

From Membrane is an analogue testing software pack which is designed for guided probe fault isolation on analogue portions of the circuit.

Named Analyst, the Wimborne, Dorset firm said that in actual operation of testing hybrid and analogue modules, the system automatically applies the test program. If the board fails the test, the operator is instructed to probe back along the sensitised paths to isolate the functional block which is defective.

The CCITT V24 interface is available if the VDU is required to drive a printer, offline storage facilities in the form of add-on cassette units or floppy disc drives; and a composite video output for driving large screen monitors.

The terminal weighs 23lb (10.5kg) and it measures 6½ x 13½ x 20½ inches (13.5 x 34 x 52 centimetres). Its six-inch screen displays 512 characters — 16 lines of 32 characters each — which are visible at dual level intensities and it can be supplied for 50/60 Hz operation.

Colle Electronics Ltd (C.W.), 33-35 Lower Combe Street, Croydon, CR0 1AA. Tel: 01-689 8822.

Membrane Ltd (C.W.), 23 Cobham Road, Ferndown Industrial Estate, Wimborne, BH21 7PE. Tel: Ferndown (0202) 893535.

Document conveyor

DESIGNED to hold computer print-outs and tapes as well as box files and paper sheets is the Type 45/35 vertical document handling system from Documenton, the newly-formed document handling division of Hyvac Conveyors.

The 45/35 uses the paternoster principle of a continuously circulating vertical conveyor that supports containers. It provides a delivery frequency of five containers a minute.

All moving parts are remote from routine operating areas, said the Sevenoaks, Kent firm, and the chain circuit is driven by Hyvac Conveyors.

Hyvac Conveyors Ltd (C.W.), Ridgeland House, Malt House Road, Stunsted, Sevenoaks, Kent. Tel: Sevenoaks (0732) 822456.

It claimed that the UFO recirculates heated air from high levels of a room back to floor level and will keep the air clean without introducing chemicals or altering the basic structure of the air. The running cost is that of a 100 watt light bulb.

In addition to removing impurities from the air, the UFO is also capable of nullifying a wide range of gases commonly used in industry, said the Southall, Middlesex firm.

It claimed that the UFO recirculates heated air from high levels of a room back to floor level and will keep the air clean without introducing chemicals or altering the basic structure of the air. The running cost is that of a 100 watt light bulb.

In addition, when numerals or English alphabetical characters are entered, they are automatically justified from the left.

ISCO pointed out that the 8001 version of Basic is to be made compatible with the keyboard.

Named MFP, GNT said that it was based on the General Electric TermNet 20 matrix printer. Designed for operator convenience, the MFP allows a selector to be used to pick the numbers of copies needed from a single copy to up to nine copies with settings in between.

The MFP is equipped with a new design of rear bar to ensure efficient handling of multi-part forms and it accepts paper stock ranging in thickness from 0.008 inches (0.0025 mm) to 0.0280 inches (0.711 mm).

GNT Automatic (C.W.), 1 Albert Street, Slough, SL1 2BH. Tel: 01-773 7241.

Business Aids is a shredding machine, the Microplus, which will turn microfilm and files into micro chips in seconds.

Made in West Germany, the Park Royal, London firm said that the Microplus is portable and can be used to destroy out-of-date film, fiche, aperture cards, jackets, hard copy, carbon film and nylon type writer ribbons.

Business Aids Ltd (C.W.), 3 Whitley Avenue, Park Royal, London NW10 7SQ. Tel: 01-808 8821.

It is a glass-fronted wall cabinet, the monitor has adjustable high and low limit relays to give audible and visual alarms. The seven-day chart in the monitor can be changed in two or three minutes.

Wright Air Conditioning, Samson Road North, Camp Hill, Birmingham, B11 1BL. Tel: 021-773 7241.

Power unit

AN EXTENSIVE range of low-cost power supply units offering a choice of voltage and current ratings is now available from Electronic Brokers.

The London, W1 firm said that general purpose units are available providing continuous, variable, stabilised and protected dc supplies.

Examples include six to 14amps (Model PG 76), 16amps (Model PG 12/18), 10 to 12amps (Model PG 3/2), 26.00 and four to 40amps at two amps (Model HS 76/40).

Known as Model 6021, the unit permits conversion of data held on paper tape on a floppy disc and vice versa. The tape can be in any size, five, six, seven or eight track types, and the floppy discs can be either IBM, non-IBM compatible formats.

Named the Neopac CS, Roneo Vickers said that it continues collating with longer so that copies were ready for binding, puncturing or stitching.

Datum (Electronics) Ltd (C.W.), Cranford Lane, Harrow, Middlesex HA1 4JL. Tel: 0895 04561.

The CS includes an eight-station manual, operated

collator and an electric logger.

Documents are collated by a collector unit over each station and dropped into slots into the logger. Each station of the collector has a capacity of up to 200 sheets and will accommodate both A5 and A4 paper sizes. Stations not required can be blanked off.

Datum (Electronics) Ltd (C.W.), Cranford Lane, Harrow, Middlesex HA1 4JL. Tel: 0895 04561.

Computer Engineering Ltd (C.W.), Cranford Lane, Harrow, Middlesex HA1 4JL. Tel: 0895 04561.

The CS includes an eight-station manual, operated

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